



Atty
Chris
CPK

City of Long Beach

DEPARTMENT OF PUBLIC WORKS
ONE WEST CHESTER STREET
LONG BEACH, NEW YORK 11561

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PROPOSALS, SPECIFICATIONS, CONTRACT FORMS AND DOCUMENTS
FOR THE
CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE

Contract No. C-918

Selected Contractor AFL GENERAL CONTRACTING

Resolution No. 03125

Resolution Date JANUARY 7, 2025

October 2024



**City of Long Beach
NEW YORK 11561**

DANIEL CREIGHTON

CITY MANAGER

CITY COUNCIL

BRENDAN FINN, PRESIDENT

CHRIS FIUMARA, VICE PRESIDENT

JOHN D. BENDO

ROY LESTER

MICHAEL REINHART

**RUSSELL DARRESS
INTERIM COMMISSIONER OF PUBLIC WORKS**

October 2024



City of Long Beach

NEW YORK 11561

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ATTACHMENTS:

- W-9 form
- New York State Vendor Questionnaire
- MWBE Forms
- New York State Prevailing Wage PRC#
- Taxpayer Identification Number and Certification
- Contractor Licensing Requirements
- Contractor Exempt Purchase Certificate
- Sample Sign



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NOTICE TO BIDDERS

PLEASE TAKE NOTE that sealed bids will be received in the Department of Public Works, Room 404, City Hall, Long Beach, New York on, Thursday, November 21, 2024 at 11:00 a.m. prevailing time for:

**CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE**

Bidders may view the broadcast on the following City of Long Beach YouTube Channel:
<https://www.youtube.com/c/cityoflongbeachNYOFFICIAL>

Plans, specifications and contract documents may be obtained by contacting the office of the Department of Public Works At 516-431-1011. All documents will be made available electronically or by pick up from the City of Long Beach, upon receipt of a non-refundable administration fee of \$50.00 in the form of a check or money order made payable to the city of Long Beach. **The documents will be available on New York State Contract Reporter, however, this office must be contacted to receive any addendums. The \$50.00 administration fee is still required.**

Each Bid must be prepared and submitted in accordance with the Instruction to Bidders and must be accompanied by Bid Security in the form of a certified check, bank check, or bid bond in the amount of ten (19%) of the total Bid.

Additionally, The Bid MUST include the Vendor's Questionnaire and the MWBE Utilization Plan.

No later than 45 (45) days after the bid opening, the Municipality shall accept bids or reject all bids. After the bid opening, a bid may not be withdrawn prior to the date that

No bid will be considered from any person who is in arrears to the City, or who is in default as surety or otherwise upon any obligation to the City, nor shall a bid be considered from any contractor whose performance on any previous contract with the City has been unsatisfactory in the opinion of the City Council. A contractor whose performance has been unsatisfactory shall not be deemed a responsible qualified bidder.

Bidders must satisfy themselves by personal examination of the site of the proposed work and shall not at any time after the submission of a bid or proposal, dispute or complain nor assert that there was any misunderstanding in regard to the nature or amount of the work to be performed.

Following agency staff has been designated as contacts for this contract:

Department of Public Works
Conor Bogue
(516) 705-7253

Please note that contracting any other agency staff regarding this contract may be a violation of state or municipal law, rule or regulation, resulting in a determination of contract non-responsibility.

Liquidated damages will be assessed for each day of delay of the contract in the amount of one thousand (\$1,000) dollars per calendar day.



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The successful bidder will be required to furnish a Performance Bond and a Payment Bond in the statutory form of public bonds required by Section 137 of the State Finance Law, each for one hundred percent (100%) of the amount of the Contract.

The following goals for MWBE participation on this project have been established at:

Minority Owned Business Enterprise (MBE)	[5]%
Women Owned Business Enterprise (WBE)	[5]% [MUNI TO CALIBRATE IN ACCORDANCE W/ OVERALL 10% REQ. FOR PROJECT.]

The Municipality is an Equal Opportunity employer.

No formal pre-bidding meeting will be held. However, questions or requests for clarification may be directed to the Department of Public Works Any reply to such an inquiry, including the initial questions, will be communicated by Addendum to all bidders who have obtained the Contract Documents.

The City reserves the right to reject any and all bids received, to waive informalities and also reserves the right to increase, decrease, omit any portions of the Specification. The City will award the Contract to the lowest responsible bidder qualified by past experience to satisfactorily perform the required work of this contract and furnishing the required security. Any Contractor submitting a bid must be able to proceed with the detailed work immediately upon Notification to Proceed, and must complete all work within the project duration indicated.

City of Long Beach
Nassau County, New York

Daniel Creighton, City Manager
Dated: October 31, 2024



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INFORMATION FOR BIDDERS

1. General

- a. The information contained in the public "Notice to Bidders" and in these specifications, together with the data shown on the Contract Plans, shall be construed as part of each bid. No verbal stipulations or qualifications will be given consideration.
- b. Each bid must be made on the form furnished by the City of Long Beach and must be accompanied by a bid security.
- c. The bid must be accompanied by a Bid Guaranty which shall not be less than ten (10%) of the total amount bid including all items of overhead. At the option of the Bidder, the guaranty may be a certified check, bank draft, negotiable U.S. Government Bonds (at par value) or a Bid Bond. The bid Bond shall be secured by a guaranty or Surety Company licensed in New York State and listed on most recent copy of Department of the Treasury Federal Register #570.

No bid will be considered unless it is accompanied by the required guaranty. Certified checks, bank drafts or Bid Bonds must be payable to the order of the City Treasurer, City of Long Beach. Cash deposits will not be accepted. The Bid guaranty shall insure the execution of the agreement and the furnishing of the surety bond or bonds by the successful Bidder, all as required by the Contact Documents. Each bid must be submitted on the prescribed forms.

- d. No bid proposal shall be withdrawn, modified, or canceled once it has been submitted. Bids submitted by mail shall be enclosed in a separate sealed envelope containing the Bid and Qualifications addressed to the Commissioner, Department of Public Works, City of Long Beach, Room 404, One West Chester Street, Long Beach, NY 11561.

Use of mail shall be at the Bidder's own risk, and the Bidder shall be responsible for physical delivery of the bid at the time and place set for opening bids.



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INFORMATION FOR BIDDERS (Cont.)

- e. The Bid security of the successful bidder will be forfeited to the City of Long Beach as liquidated damages in case of failure of said bidder to enter into a contract and furnish the necessary bond for the execution of the work within ten (10) days after receipt of written notice from the City of Long Beach to do so has been mailed to bidder's address as stated in his Proposal.
- f. The CD disk, containing Proposal, Specifications, Information for Bidders, Contract Plans, Contract Forms and Documents may be obtained and/or examined at the office of the Commissioner, Department of Public Works, City of Long Beach, Room 404 City Hall, Long Beach, N.Y. 11561. All bids are to be submitted in Room 404. A fee of fifty (\$50.00) dollars per contract set is required. Checks or Money orders are to be payable to the City Treasurer, City of Long Beach, New York. The Administration fee is required for all bidders.

2. Verbal Answers and Addenda

- a. The City, its agents, servants, employees, or Engineers shall not be responsible in any manner for verbal answers to inquiries made regarding the meaning of the Contract Drawings, Specifications or Contract Documents prior to the awarding of the contract.
- b. Every request for such an interpretation shall be made in writing to the Engineer. Any inquiry received seven (7) or more days prior to the date fixed for the opening of bids will be given consideration. Every interpretation made to a bidder will be in the form of an Addendum to the Contract Documents and when issued will be on file in the office of the Engineer and copies will be faxed or emailed to all prospective Bidders. It shall, however, be the Bidder's responsibility to make inquiry before bids are received as to the Addenda issued. All such Addenda shall become part of the Contract Documents and all Bidders shall be bound by such Addenda.

3. Inspection of Site

- a. Each Bidder should visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to the work required under this contract and the restrictions attending the performance of the Contract. The Bidder shall examine and familiarize himself with the Contract Drawings, Specifications, and all other Contract Documents.



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The Contractor by the execution of the Contract shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or visit the site and acquaint himself with the conditions there existing and the City will be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof. The City makes no representation as to the accuracy of materials and types of the structures, including the equipment, fixtures and other property, and the Bidder is obligated to check the accuracy thereof.

- b. Bidders by satisfying themselves by personal examination of the location of the proposed work and of the actual conditions and requirements of the work shall not, at any time after the submission of the Proposal, dispute or complain of such estimate or assert that there was any misunderstanding in regard to the nature of the work to be done.

4. Form of Proposal

- a. The Proposals must be submitted on the forms furnished by the City. Failure to use said Form of Proposal, inclusion of bids not requested or the exclusion of any bid requested may result in rejection of the bid. The bid document shall include pages 17-30 including New York State Vendor Questionnaire and the M/WBE Utilization Plan; attachments at end of book
- b. No Proposal shall be received by the City unless the bidder tendering it is known to be skilled in work of a similar nature to that as detailed in the Proposal.
- c. Bidders must submit their Proposal upon the following express conditions, which shall apply to and become part of each Proposal received.
 - i) Bids will be compared by total amounts, which shall be the sum of the products of the quantities, if any multiplied by the unit price bid for the various items; with due consideration being given to lump sum prices bid or unit price for contingent items, if any. Unbalanced bids may not be accepted.
 - ii) Each bidder shall fill out in ink, in both words and figures, in the spaces provided, his unit or lump sum bid, as the case may be, for each item in the Proposal. The unit or lump sum price, in words, shall be considered correct.



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- iii) All corrections made by the Contractor on the Proposal shall be done in ink by lining out the Contractor's original entry, then entering the new words or numbers and initialing after the last word or number entered.

5. Envelopes

All proposals must be submitted in a sealed envelope, which, in addition to the proposal, shall contain a certified check or bid bond.

6. Subcontractors

The bidder is specifically advised that any person, firm or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the City of Long Beach

7. Name of Bidder

Each Bidder must state in the Proposal his full name and business address, telephone number, and treasury number, and the full name, home address, social security number of every person, firm or corporation interested therein and the address, of every person or firm or president and secretary of every corporation interested with him. If no other person, firm or corporation were so interested, he must affirmatively state such fact. The Bidder must also state that: "the proposal is made without any connection, directly or indirectly, with any Bidder for the work mentioned in his proposal and is, in all respects, without fraud or collusion; he has inspected the site of proposed work; he has examined the Conditions of Contract, Specifications, Contract Drawings and Information for Bidders; no person acting for or employed by the City of Long Beach, or is directly or indirectly interested therein, or in the supplies or work to which it relates or in any portion of the prospective profit thereof: he proposes and agrees if his Proposal or bid are accepted, to execute contract with the City of Long Beach to perform the work mentioned in the Conditions of Contract Specifications attached; and the amount he will accept in full payment".



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Any subsequent change of subcontractor or agreed upon amount to be paid to each subcontractor must be approved by the City, upon a showing of "legitimate construction need" for the change, which must be open to public inspection. The term "legitimate construction need" is defined to include, but not be limited to (1) a change in project status as determined pursuant to Labor Law 222(2)€, relative to project labor agreements, or (4) a situation in which the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

8. Time for Receiving Bids

- a. Bids received prior to time of opening will be securely kept unopened. The officer whose duty is to open them will decide when the specified time has arrived, and no Bid received thereafter will be considered; except that when a Bid arrives by mail after the time fixed for opening, but before the reading of other bids is completed, and it is shown to the satisfaction of the City that the non-arrival on time was due solely to delay in the mails for which the Bidder was not responsible, such Bid will be received and considered.
- b. Any bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for Receipt of Bids, provided such telegraphic communication is received prior to the closing time, and, provided further, the City is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the additional or subtraction or other modification so that the final prices or terms will not be known until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification. All telegraphic communications shall be addressed to the Commissioner, Department of Public Works.

Bidders are cautioned that, while telegraphic modifications of bids may be received as provided above, such modifications, if not explicit and if any sense subject to misinterpretation, shall make the Bid so modified or amended, subject to rejection.

9. Opening of Bids

At the time and place fixed for opening of bids, the City will cause to be opened and publicly read aloud every Bid received within the time set for receiving Bids, irrespective of any irregularities therein. Bidders and other persons interested may be present, in person or by representative.



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10. Withdrawal of Bids

Bids may be withdrawn before bid opening on written or telegraphic request dispatched by the Bidder in time for delivery in the normal course of business prior to the time fixed for opening; provided, that written confirmation or any telegraphic withdrawal over the signature of the bidder is placed in the mail and postmarked prior to the time set for bid opening. The Bid guaranty of any Bidder withdrawing his Bid in accordance with the foregoing conditions will be returned.

11. Collusive Agreement

- a. Each Bidder submitting a bid for any portion of the work contemplated by the documents on which bidding is based shall execute, and attach thereto, an affidavit substantially in the form herein provided, as well as the Statement of non-collusion, herein also provided, pursuant to Section 103.d of the General Municipal Law of New York, to the effect that he has not colluded with any other person, firm or corporation in regard to any bid submitted.
- b. Before executing any subcontract, the successful Bidder shall submit the name of any proposed subcontractor for approval by the Engineer and affidavit substantially in the form prescribed in the Contract Documents.

12. Award of Contract - Rejection of Bids

The prices bid, covering the various items of each Contractor, will be the basis of award of contract, with due consideration for the time of construction either as stated by the City or if stated by the Bidder to be different from that stipulated by the City. If discrepancies exist, the written (in words) unit price shall govern and the figure will be corrected to reflect the correct total bid for various items. Lump sum prices written in words shall govern.



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- a. The Contract will be awarded to the lowest responsible Bidder complying with the conditions of the Notice To Bidders provided such Bid is reasonable and it is to the best interests of the City. The City, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in its interest.
- b. The City reserves the right to consider a Bidder unqualified if he cannot demonstrate that he has or can perform with his own forces the major portions of the work involved in the project.
- c. The City also reserves the right to reject the bid of any Bidder, who has previously failed to perform properly, or to complete on time, contracts of a similar nature, who is not in a position to perform the Contract, or who has without just cause neglected the payment of bills or otherwise disregarded his obligations to subcontractors, material men, or employees. In determining the lowest responsible Bidder, the following matters in addition to those abovementioned, will be considered: Whether the bidder involved (1) maintains a permanent place of business; (2) has adequate plant equipment available to do the work properly and expeditiously; (3) has suitable financial resources to meet the obligations incident to work; (4) has appropriate technical experience.
- d. The ability of any Bidder to obtain a performance bond will not be regarded as the sole test of such Bidder's competency or responsibility.
- e. The City will not award the Contract to any Contractor who is, at the time, ineligible under the provisions of any applicable regulations issued by the Secretary of Labor, United States Department of Labor, or is not qualified under applicable City, County or State Laws.

13. Execution of Agreement, Performance and Payment Bond

- a. Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, the successful Bidder shall execute the Agreement in the form include in the Contract Documents in three (3) copies.



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- b. The Bidder to whom a contract is awarded, together with the sureties offered by him, shall attend at the office of the Public Works, within (10) days, Saturdays, Sundays, and City Holidays excluded, after the date of notification, by certified mail, or acceptance of his Proposal and there sign the Contact for the work and furnish the approved security in an amount equal to the full amount of the Contract for its performance and maintenance.
- c. Coincident with the signing of the contract, shall be submitted as required with the executed agreements and shall be the statutory form of Public Bonds required by section 137 of the State Finance Law. The successful Bidder shall execute a Performance Bond and a Payment Bond, each underwritten by a reliable, solvent surety company and listed on the latest copy of the Department of the Treasury Federal Register #570 in the full amount of one hundred percent (100%) of the accepted bid. The form and other features of the bond shall meet the approval of the City. The surety Company shall be responsible for the Contractor's guaranteeing to the City the faithful performance of the contract, payment of all just claims for materials, labor and wages in connection therewith. The Payment Bond shall provide security for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted for labor, materials, tools, equipment, or services of any nature, including utility and transportation services, employed or used by him in performing the work. Such bonds shall be in the same form as that included in the Contract Documents, or such other form as is acceptable to the City, and shall bear the same date as, or a date subsequent to, the date of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bond or bonds. A guaranty or surety company licensed in the State of New York shall sign this bond, or bonds
- d. The failure of the successful Bidder to execute such Agreement and to supply the required bond or bonds within ten (10) days after notification by certified mail to appear for signing of contract(s), or within such extended period as the City may grant, based upon reasons determined sufficient by the City, shall constitute a default, and the City may either award the Contract to the next lowest responsible Bidder the difference between the amount for which a Contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the Bid Bond. If a more favorable bid is received by re-advertising the defaulting Bidder shall have no claim against the city for a refund.



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14. Insurance

The amounts, types and clauses to be included in the insurance required to be carried by the successful bidder and his subcontractors are listed in the Conditions of Contract.

15. Liquidated Damages

- a. The successful Bidder, upon his failure or refusal to execute and deliver the contract and bonds required within 10 days after he has received notice of the acceptance of his bid, shall forfeit to the City as liquidated damages for such failure or refusal, the security deposited with his bid.
- b. Bidder agrees to commence work on or before a date to be specified in a written "Notice to Proceed" and to fully complete his work on or before the prescribed completion date. The Bidder also agrees to pay as liquidated damages, the sum of one thousand (1000) dollars for each consecutive calendar day thereafter the work remains uncompleted.

16. Power of Attorney

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

17. Notice of Special Conditions

Attention is particularly called to those parts of the Contract Documents and Specifications, which deal with the following:

- a. Inspection and testing of materials.
- b. Insurance requirements.
- c. Wage rates.
- d. Stated allowances.



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18. Conditions of Work

Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful Bidder of his obligations to furnish all material and labor necessary to carry out the provisions of his contract. In so far as possible the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.

19. Hiring of Local Labor

The maximum feasible employment of local labor is covered in Employment of Local Labor Section of the General Conditions.

20. Labor Requirements

This project includes both State and Federal prevailing wages. If Federal Davis-Bacon wage rates differ from the New York State prevailing wage rates, then the higher of the two rates shall apply and be paid to eligible workers.

21. M/WBE

All bidders must submit an M/WBE Utilization Plan with their bid that utilizes enterprises identified in the New York State Minority and Women-Owned Business Enterprises Directory of Certified Firms in order to promote and assist the participation of certified M/WBEs in an amount equal to five percent (5%) minority-owned business enterprises ("MBE") and five percent (5%) [MUNI TO CALIBRATE IN ACCORDANCE W/ OVERALL 10% REQ. FOR PROJECT] women-owned business enterprise ("WBE") of the total dollar value of the contract. The successful bidder shall use good faith efforts to solicit active participation by such M/WBEs in accordance with the Contract Documents and the submitted M/WBE Utilization Plan. The Contractor agrees to be bound by the provisions of Section 316 of Article 15-A of the Executive Law, which pertain to enforcement of Article 15-A.

All bidders must submit an M/WBE Utilization Plan with their bid



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22. Vendor Responsibility

The New York State Vendor Responsibility Questionnaire For-Profit (CCA-2) shall be submitted by the apparent low bidder to the Owner as a condition of contract award.

23 Pre-Bid Meeting (NA)

All prospective Bidders will be invited to attend a Pre-Bid conference scheduled for _____ At such time, any questions or comments regarding the scope of the proposed project will be addressed.

24. Qualification of Bidders

In the consideration and acceptance of any proposal, the City shall be entitled to exercise every measure of lawful discretion evaluating the financial history and ability of the proposer and his past performance in ventures of this or similar nature. Such data will be considered either as a material or controlling factor in the acceptance of any bid submitted. All Contractors will be required to provide information regarding their qualification as outlined in the enclosed PROPOSAL section.



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PROPOSAL (General)

Place: _____

Bid Date: _____

Long Beach Contract No: _____

Proposal of _____ (hereinafter called
“Bidder”) (either a corporation, organized and existing under the laws of the State of
_____, or a partnership, joint venture or an individual) doing business as
_____*.

To the City Council of the City of Long Beach (hereinafter called “Owner”)

Gentlemen:

**The Bidder, in compliance with your Notice to Bidders for:
CITY OF LONG BEACH**

**POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE**

having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies and to complete the project in accordance with the contract documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

- Insert corporation, partnership, joint venture or individual as applicable.



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PROPOSAL (General) - Cont.

The undersigned further declares that the only person, persons, company or parties interested in this Proposal as principals are named herein; that he has carefully examined all contract forms and plans; that he has made a personal examination of the site of the proposed work and such investigations as are necessary to determine the character of the materials to be encountered, and he proposes and agrees that if this Proposal is accepted, he will contract with the City of Long Beach, to provide the necessary machinery, tools apparatus and other means of construction, and all materials and labor called for by the said Contract, Plans and Specifications, including all Addenda issued prior to the date of opening of the Bids (except for Addendum enclosing Prevailing Wage Rates which may be issued after such date) or necessary to complete the work in the manner and within the time set forth in the Contract, Plans and Specifications, for the lump sum price set forth in the following Schedule of Prices:



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COPY.

PROPOSAL (General)

Place: Dept. Public Works Room 404

Bid Date: 11/3/24

Long Beach Contract No: _____

Proposal of AFL General Construction (hereinafter called
“Bidder”) (either a corporation, organized and existing under the laws of the State of
_____, or a partnership, joint venture or an individual) doing business as

_____ *.

To the City Council of the City of Long Beach (hereinafter called “Owner”)

Gentlemen:

**The Bidder, in compliance with your Notice to Bidders for:
CITY OF LONG BEACH**

**POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE**

having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies and to complete the project in accordance with the contract documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

- Insert corporation, partnership, joint venture or individual as applicable.



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PROPOSAL (General) - Cont.

The undersigned further declares that the only person, persons, company or parties interested in this Proposal as principals are named herein; that he has carefully examined all contract forms and plans; that he has made a personal examination of the site of the proposed work and such investigations as are necessary to determine the character of the materials to be encountered, and he proposes and agrees that if this Proposal is accepted, he will contract with the City of Long Beach, to provide the necessary machinery, tools apparatus and other means of construction, and all materials and labor called for by the said Contract, Plans and Specifications, including all Addenda issued prior to the date of opening of the Bids (except for Addendum enclosing Prevailing Wage Rates which may be issued after such date) or necessary to complete the work in the manner and within the time set forth in the Contract, Plans and Specifications, for the lump sum price set forth in the following Schedule of Prices:



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POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER INCLUDING LOCKER ROOM/BATHROOM UPGRADE

BASE BID – LOCKER ROOM/BATHROOM UPGRADE

Item Number	Item/Description with Price Written in Words	Lump Sum
1	General Requirements For: <u>Twenty Thousand</u> Dollars _____ Cents	\$ <u>20,000</u>
2	Demolition Work For: <u>Thirteen Thousand Five Hundred</u> Dollars _____ Cents	\$ <u>13,500</u>
3	Architectural For: <u>Eighty Seven Thousand Three hundred</u> Dollars _____ Cents	\$ <u>87,300</u>
4	Masonry For: <u>Thirteen Thousand</u> Dollars _____ Cents	\$ <u>13,000</u>
5	HVAC System For: <u>Twenty one Five Thousand</u> Dollars _____ Cents	\$ <u>25,000</u>
6	Plumbing For: <u>Thirty Six Thousand</u> Dollars _____ Cents	\$ <u>36,000</u>
7	Electrical For: <u>Thirty Four Thousand</u> Dollars _____ Cents	\$ <u>34,000</u>
8. Allowance	Contingency – Base Bid For: <u>Ten Thousand</u> Dollars _____ Cents	\$10,000.00



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TOTAL AMOUNT OF BASE BID ITEMS 1 THROUGH 8

In Figures: \$ 238,800

In Words: Two hundred Thirty Eight Thousand Eight hundred

Bids will be compared on the basis of the TOTAL AMOUNT OF BASE BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

ADD ALTERNATE - POLICE DEPARTMENT COMMUNICATION CENTER

Item Number	Item/Description with Price Written in Words	Lump Sum
9	General Requirements For: <u>Twenty Five Thousand</u> <u>Dollars</u> <u>Cents</u>	\$ <u>25,000</u>
10	Demolition Work For: <u>Fourteen Thousand Three Hundred</u> <u>Dollars</u> <u>Cents</u>	\$ <u>14,300</u>
11	Architectural For: <u>Thirty Eight Thousand Eight Hundred</u> <u>Dollars</u> <u>Cents</u>	\$ <u>38,800</u>
12	Structural Steel For: _____ <u>Dollars</u> <u>Cents</u>	\$ <u>0</u>
13	Structural Concrete For: <u>Five Thousand five Hundred</u> <u>Dollars</u> <u>Cents</u>	\$ <u>5,500</u>
14	Masonry For: <u>Eleven Thousand Seven Hundred</u> <u>Dollars</u> <u>Cents</u>	\$ <u>11,700</u>
15	HVAC For: <u>One hundred Thousand</u> <u>Dollars</u> <u>Cents</u>	\$ <u>100,000</u>



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NEW YORK 11561

Item Number	Item/Description with Price Written in Words	Lump Sum
16	Electrical For: <u>Twenty Five Thousand</u> Dollars _____ Cents	\$ <u>25.00</u>
17. Allowance	Contingency – Add Alternate Bid For: <u>Twenty Five Thousand</u> Dollars _____ Cents	\$25,000.00

TOTAL AMOUNT OF ADD ALTERNATE BID ITEMS 09 THROUGH 17

In Figures: \$ 245,300

In Words: Two hundred Forty Five Thousand Three hundred

Bids will be compared on the basis of the TOTAL AMOUNT OF ADD ALTERNATE BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

GRAND TOTAL AMOUNT OF BID ITEMS 1 THROUGH 17

In Figures: \$ 484,100

In Words: Four Hundred Eighty Four Thousand One hundred

Bids will be compared on the basis of the GRAND TOTAL AMOUNT OF BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

The Owner reserves the right to omit or add to the construction of any portion or portions of the work heretofore enumerated or shown on the plans.

Name of Bidder: AFL General Construction

Address of Bidder: 36 Commerce Dr. Farmingdale NY 11735

Federal I.D. Number: 27-1932824

Telephone: 631-446-1102

Signed by: [Signature]

Title: Gizem Marin, President

Date: 12/4/24



City of Long Beach

NEW YORK 11561

Work shall be completed within 90 Consecutive Calendar days after date of Contract signing.

Name of Bidder AFL General Construction

Address of Bidder 36 Commera Dr. Farmingdale NY 11725

Federal I. D. Number 27-1932824

Telephone Number 631-446-1103

Signed By Jay J

Title Gizem Marine President

Date 12/4/24

Vendor's Questionnaire must be included with Bid Document (see attachments)



City of Long Beach

NEW YORK 11561

PROPOSAL (Declaration)

Herewith is a Certified Check or Bid Bond for the following Contract (equal to at least ten percent (10%) of the Total Bid or Total Alternate Bid, whichever is the greater) in the amount of:

10% (\$)

payable to the City of Long Beach, as a surety that the undersigned will enter into a contract for the work within ten (10) days of date of Notice of award of Contract. The undersigned proposes to commence work and order materials in accordance with the written "Notice to Proceed" and to complete the work in accordance with the following schedule and guarantees. The work performed and the materials furnished for a period of one (1) year after the final acceptance of the work. Bidder agrees to pay as liquidated damages, the sum of \$1,000.00 for each consecutive day thereafter.

The City of Long Beach reserves the right to award the contract to whichever bidder whose proposal results in the least cost to the City

No work shall be performed on Saturday, Sunday or Holidays, without the prior expressed approval of the Engineer.



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders)

Bidders are required to provide the following information. Bidders may attach additional sheets as needed.

1. Name of Bidder AFL General Construction

2. Permanent Main Office Address, Including City, State And Zip Code:
36 Commerce Dr.
Farmingdale, NY 11735

3. Telephone Number (631) 446-1100
Fax Number (631) 446 - 1191

4. When Organized 2009

5. If A Corporation, Where Incorporated NY

6. Description of General Character of Work Typically Bid By Firm:
Interior Renovations of Schools,
Municipality Buildings etc.



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

7. Current Contracts on Hand:

Project Title and Location	Estimated Completion Time	Estimated Value	Reference Person/Inspector with Phone Number
East Williston JFSD 11 Bacon Rd, Old Westbury 1423 Building Therapy Flowers Park 491 5th Ave New Rochelle	2 months	\$1,130,000	Ronnie Nalls (Park (631) 415-3873 Fast Construction)
	1 year	1,400,000	Lauren O'Connor (914) 654-2287 City Deputy Commissioner
Jericho Public Library	3 months	277,631	Bob Callendo (347) 682-3276

8. Has the Firm ever failed to complete any Work? If so where and why?

no

9. Has the firm ever defaulted on a Contract? If So, Where And Why?

no



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

10. List recent Contracts that demonstrate experience germane to the project described herein:

Year	Project Name Location	Estimated Value	Description	Contact Person & Phone No.

11. List the Major Equipment available for this contract

N 1 18



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

12. List All Principals and Officers and Relevant Experience of Each.

Name	Title	Experience
Giram Marano	President	15 years in construction

13. Give Primary Bank Reference and Credit Available:

Bank: M & T Bank

Address: 50 Jericho Quadrangle Suite 120
Jericho NY 11753

Credit Amount \$ 250,000

14. Will the firm, upon request, fill out a detailed financial statement dated within 30 days of the Bid date and furnish any other information that may be required by the City of Long Beach?

Yes



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

- 15(a) Has the firm ever been a party to or otherwise involved in any action or legal proceeding involving matters related to race, color, nationality, sex or religion? If so, give full details.

N9

- (b) Has the firm ever been accused of discrimination based upon race, color, nationality, sex or religion in any actions or legal proceeding? If so, give full details.

N9

- (c) The City may make an investigation it deems necessary to assure itself of the ability of the Bidder to perform the work, including but not limited to obtaining a certified financial statement from the Bidder. The ability of any Bidder to obtain a performance bond shall not be regarded as the sole test of the Bidder's Competency, Reliability and Responsibility.

16. What percent of the proposed project will be performed by Subcontractor?

45%

17. What specific activities are proposed for subcontractor involvement?

Electric, Plumbing, HVAC

18. Is the firm currently or has the firm ever been disbarred from doing business in New York State?

No



City of Long Beach

NEW YORK 11561

PROPOSAL (Declaration) cont'd

Grem F. Mann _____
Name Name

_____ Name Name

_____ Name Name

Bidder : AFL General Construction

Bidder's Address 36 Commerce Dr.

Farmingdale NY 11735

Signed By: J.F.M.

Title: Grem Mann, President

Corporate Seal



City of Long Beach

NEW YORK 11561

PROPOSAL - (Declaration) Cont.

The undersigned acknowledges receipt of the following Addenda :

ADDENDUM NO. 1 DATE : 11/19/24

ADDENDUM NO. 2 DATE : 11/19/24

ADDENDUM NO. 3 DATE 11/25/24
4 11/27/24

The undersigned is a Corporation (state whether single individual, or if a partnership, give names of all partners, or if a corporation, give names of principal officers).

<u>Grem F. Marino</u>	Name	Address
<u> </u>	Name	Address
<u> </u>	Name	Address

Bidder: AFL General Construction

Bidder's Address: 36 Commerce Dr.

Farmingdale, NY 11735

Signed By Grem F. Marino

Title: Grem Marino, President

Corporate Seal



City of Long Beach

NEW YORK 11561

PROPOSAL (Declaration Cont.)

The undersigned is a joint venture, consisting of the following corporations:
(give names of all principal officers)

Name _____ Address _____

Bidder : _____

Bidder's Address : _____

Signed By : _____

Title : _____

Corporate Seal

Name _____ Address _____

Name _____ Address _____

Name _____ Address _____

Bidder : _____

Bidder's Address : _____

Signed By : _____

Title : _____

Corporate Seal



City of Long Beach

NEW YORK 11561

PROPOSAL - Non-Collusive Bidding Certificate

Pursuant to Section 103-D of the General Municipal law, the Contractor makes the following statement under penalty of perjury and by submission of this bid or proposal the Bidder certifies that:

- (a) This bid or proposal has been independently arrived at without collusion with any other Bidder or with any competitor or potential competitor; (b) this bid or proposal has not been knowingly disclosed and will not be knowingly disclosed prior to the opening of the bids or proposals for this project to any other Bidder, competitor or potential competitor; (c) no attempt has been or will be made to induce a bid or proposal; (d) the person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in his behalf; (e) that attached hereto (if a corporate bidder) is a certified copy of resolution authorizing the execution of his certificate by the signatory of this bid or proposal in behalf of the corporate bidder.

Resolved that AFL General Construction be
(Name of Corporation)
authorized to sign and submit the bid

or proposal of this corporation for the following project:

CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE

and to include in such bid or proposal the certificate as to non-collusion required by Section One Hundred Three-d of the General Municipal Law as the act and deed of such corporation, and for any inaccuracies or misstatements in such certificate this corporate Bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution adopted by

AFL General Construction corporation at a meeting of its Board of Directors held on the

24th day of Dec, 2024. (Seal of the Corporation)

Secretary

Respectfully Submitted:

Firm Name: AFL General Construction

Firm Address: 36 Commerce Dr. Farmingdale NY 11735
Signed By:



City of Long Beach

DEPARTMENT OF PUBLIC WORKS
LONG BEACH, NEW YORK 11561

Tel: (516) 431-1011

ADDENDUM NO. 1

Total page(s) - 4

Proposals, Specifications, Contract Forms and documents for:

LBPD DISPATCH & LOCKER ROOM/BATHROOM UPGRADE

Date of Addendum: November 19, 2024

TO ALL PROSPECTIVE BIDDERS FOR:

CITY OF LONG BEACH

Questions and Answers

1. Can I make an appointment to visit the site?

Response: Site visit was scheduled for November 13, 2024 at 10:00am as indicated in the RFP.

2. Is the maintenance bond for 1 year or 2?

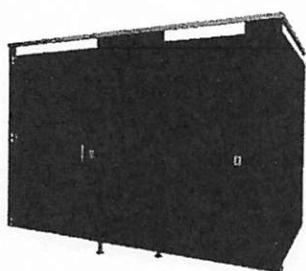
Response: 1 year.

3. We are a WBE contractor with NYS, does that fulfill the M/WBE requirement or do I still need to get subcontractors as well?

Response: Yes, your company fulfill the M/WBE requirement for the project. No need to get M/WBE contractors.

4. Is there a Toilet Partition Specification? There is not one listed in the specification book, only a Toilet and Bath Accessory.

Response: In reference to IFB package Sheet A-103



Type: Pedestal Mounted Phenolic Toilet Partitions

Manufacturer: Hadrian

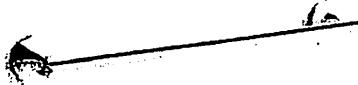
Model No.: Elite Max Series 84"

Color/ Finish: 318 Florence Walnut Class B

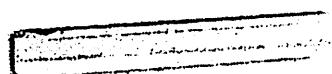
Product URL: [Pedestal Mounted Solid Phenolic Core Toilet Partitions](#)

5. Toilet Accessory Specification does not list model numbers.

Response: In reference to IFB package Sheet A-702



Type: 18" towel bar
Manufacturer: Kohler
Model No.: Components® K-78372T-CP
Color/ Finish: Polished Chrome
Product URL: [Components™ 18" towel bar | 78372T | KOHLER](#)



Type: 14" floating shower shelf
Manufacturer: Kohler
Model No.: Choreograph® K-97622-SHP
Color/ Finish: Bright Polished Silver
Product URL: [KOHLER | K-97622 | Choreograph 14-Inch Floating Shower Shelf](#)



Type: Paper Towel Dispenser White
Manufacturer: Mediclinics or approved equal
Model No.: DT2106
Color/ Finish: White
Product URL: [Paper towel dispenser with C/Z folds](#)



Type: Toilet paper holder
Manufacturer: Kohler
Model No.: Elate™ K-27292-CP
Color/ Finish: Polished Chrome
Product URL: [K-27292-CP | Elate™ Toilet paper holder | Studio KOHLER®](#)

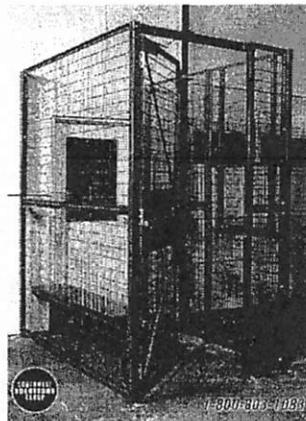


Type: Stainless Steel Inter-Lok Angle Frame Mirror
Manufacturer: American Specialties Inc
Model No.: 0600-B2448
Color/ Finish: Stainless Steel
Product URL: [Stainless Steel Inter-Lok Angle Frame Mirror - Variable Reflective Surfaces and Sizes - 0600 Series - | American Specialties](#)

6. There's a lounge chair and a fridge shown as well, are we responsible or is that the police departments?

Response: FF&E shall be by LBPD and to be excluded from proposers' pricing.

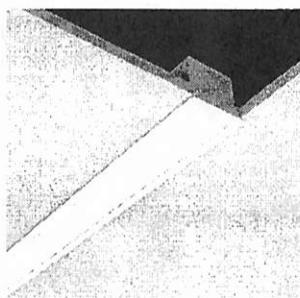
7. The jail cell for the dispatch office has no manufacturer or specification listed.
Response: See below.



Type: Temporary Holding Cell with Hinged door
Manufacturer: Southwest Solutions Group
Model No.: Style 840, 2"x1" 10 Gauge Woven Mesh
Color/ Finish: Gray
Product URL: [Temporary Holding Cells | Southwest Solutions Group](#)

8. What type of wall is demolished in dispatch office? Block or framed?
Response: CMU wall.

9. Are the center ceiling lights in dispatch office recessed? No detail?
Response: In reference to IFB package Sheet A-201



Type: 4' Recessed Linear LED
Manufacturer: Corelite
Model No.: Continua SQ4 Recessed
Color/ Finish: White
Product URL: [Continua SQ4 Recessed | Cooper Lighting Solutions | Cooper Lighting Solutions](#)

Installation Instructions: [Corelite-SQ4-Recessed-Grid-T1-T2-Installation-Instructions.pdf](#)

10. I see no shower valve model or model number on the plumbing schedule.



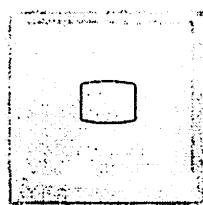
Type: Rite-Temp® shower trim kit, 1.75 gpm
Manufacturer: Kohler
Model No.: Venza® K-TS28128-4G-CP
Color/ Finish: Polished Chrome
Product URL: [Venza Rite-Temp® Shower Faucet Trim Set, 1.75 GPM | K-TS28128-4G | KOHLER](#)



Valve: Rite-Temp® pressure-balancing valve

11. The specific extra slim shower tray by ROCA which is called for on the schedule is not sold in the U.S.

Response: In lieu of the unavailable item, please provide the specified product below.



Type: 36" x 36" alcove shower base, center drain
Manufacturer: Kohler
Model No.: Archer™ K-9396-0
Color/ Finish: White
Product URL: [K-9396-0 | Archer™ 36" x 36"](#)
[alcove shower base, center drain | Studio](#)
[KOHLER®](#)

12. The job has a 90 day scope, how should we split the general conditions per bid sheet? If you do the alternate is there more time? Or how do we split the 90 days?

Response: 30 days for the Locker/Bathroom Upgrade and 60 days for the Dispatch Communication Center Add Alternate.

13. Is there a specific manufacturer on the epoxy floor?

Response: Manhattan Epoxy Co. or approved equal.

14. Is there an integral epoxy base on epoxy floor areas?

Response: As recommended by manufacturer, i.e. waterproofing membrane, reinforcing membrane, etc.

15. Do the epoxy floor areas require underlayment cement (1/2" self level?)

Response: Yes. Use a cement-based underlayment or self-leveling concrete.

End of Addendum No. 1

Receipt of Addendum No.1

Acknowledged and Subscribed to:

Contractor Name: AFL General Const.

By: (sign in ink) JG

Title: Gizem Marin Resident



City of Long Beach

DEPARTMENT OF PUBLIC WORKS
LONG BEACH, NEW YORK 11561

Tel: (516) 431-1011
Fax 516-431-5008

ADDENDUM NO. 2

Proposals, Specifications, Contract Forms and documents for:

LBPD Dispatch & Locker Room/Bathroom Upgrade

Date of Addendum: November 19, 2024

To: All Prospective Bidders:

Please take note:

- Pre Bid Walk Through: November 22, 2024 @ 11:00 a.m.
All attendees to meet in lobby of City Hall, One West Chester Street, Long Beach, NY 11561
- Revised bid date: sealed bids will be received
November 27, 2024 @ 11:00 a.m. in the Department of Public Works room 404 in City Hall

End of Addendum No. 2

Receipt of Addendum No.2

Acknowledged and Subscribed to:

Contractor Name: APL General Const.

By: (sign in ink) JM

Title: Green Marine President



City of Long Beach

DEPARTMENT OF PUBLIC WORKS
LONG BEACH, NEW YORK 11561

Tel: (516) 431-1011
Fax 516-431-5008

ADDENDUM NO. 3

Total page(s) - 3

Proposals, Specifications, Contract Forms and documents for:

LBDP Dispatch & Locker Room/Bathroom Upgrade

Date of Addendum: November 25, 2024

To: All Prospective Bidders:

Please take note:

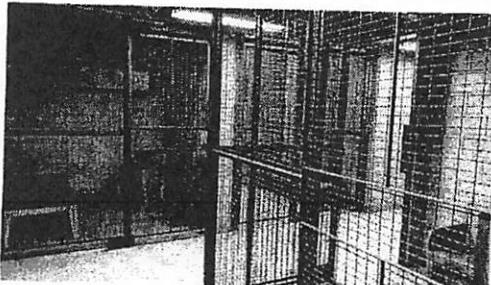
- Revised bid date: sealed bids will be received **December 5, 2024 @ 11:00 a.m.** in the Department of Public Works room 404 in City Hall

Questions and Answers

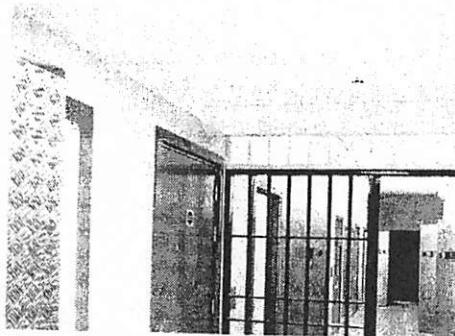
- Please confirm that the MBE /WBE is 5%/5%. This is conflicted with the requirements shown on page 80 of Conditions of contract showing 30%.
Response: 5%/5% is acceptable. Page 80 refers to larger projects.
- Refer to page 50 of Conditions of contract for insurance requirements.
Please confirm what limits of coverage for insurance umbrella coverage would be required. Based on the table is <10m is million dollars or thousands. Need to confirm Umbrella limits is 5 million or 10 million.
Response: see page 52 for clarification. The liability insurance is \$2,000,000/\$2,000,000
- Refer to specifications section 024119 Demolition. The description is removal of a diesel generator. Please clarify.
Response: Specification Section 02 41 19 Selective Demolition is hereby removed and shall not be made part of the project.
- Based on previous city of Long Beach projects, there has been requirements for NYS Apprenticeship certification for all labor trades. Please confirm that project does not require this. NEED TO CONFIRM only NYSDOL prevailing wages.
Response: Apprenticeship Program is not required.
- We reached out to Southwest Solutions Group for pricing on the temporary holding cell as per the information provided in Addendum No. 1 and they have the following

questions: Is this a 3-wall or 4-wall system? Would you like a ceiling? The image on the addendum is for a "driving cage" but if this is for a temporary holding cell, we may need to enclose this w four walls and a ceiling for prisoner restraint. Please confirm.

Response: In reference to sheets A-102 & A-802, the cell is composed of one (1) new wire partition panel connected to the existing building walls. Ceiling specification is Metalworks Securelock 5488P1 as stated in Sheet A-152.



Temporary holding cell examples (SSG)



Ceiling for non-accessible plenum areas
(Metalworks Securelock)

6. Ceiling access for bathroom plumbing on the second floor is through a jail area, are these metal ceilings to be removed and replaced as needed for new piping access by the contractor? We are not sure if this material is available or contains lead paint.

Response: Methods and means are the responsibility by the contractor. The contractor shall restore to its original condition or better, or replace in kind any components impacted by its work.

7. Item #15 on the bidding sheet is for plumbing, there really is none in this area except HVAC drains. There is no Item # for HVAC work which is a major component.

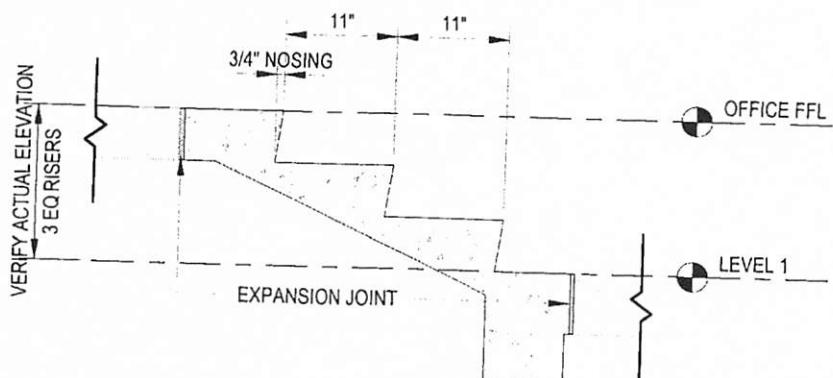
Response: Please find enclosed revised Pricing Sheet, "LBDP_Pricing Sheet_Rev1.pdf"

8. As per walkthrough we are confirming the plaster finish is not necessary above the ceiling line.

Response: Correct

9. Drawing A-802 has a concrete stair detail with no measurements or specifications of concrete thickness. To confirm the existing floor in this area is to be sawcut and removed for new stairs?

Response: Please see new stair detail below.



11. Who is the manufacturer that holds the warranty of the roof?
Response: Contractor - Metropolitan Construction Systems, Inc.; Warranty - Versico Total Roofing System Warranty with expiration date 11/22/2035
12. Who is responsible for furnishing the new furniture including the gun box?
Response: FF&E shall be by LBPD and to be excluded from proposers' pricing.
13. Is the police department responsible for the movement, and removal of IT/data and communications equipment?
Response: Yes

End of Addendum No. 3

Receipt of Addendum No. 3

Acknowledged and Subscribed to:

Contractor Name: AFL General Construction

By: (sign in ink) J. J. S.

Title: Grem Morris, President



City of Long Beach

DEPARTMENT OF PUBLIC WORKS
LONG BEACH, NEW YORK 11561

Tel: (516) 431-1011
Fax 516-431-5008

ADDENDUM NO. 4

Total page(s) - 2

Proposals, Specifications, Contract Forms and documents for:

LBPD Dispatch & Locker Room/Bathroom Upgrade

Date of Addendum: November 27, 2024

To: All Prospective Bidders:

Please take note:

- Cut off for RFP questions is today, November 27, 2024 at 12:00 pm.
All questions must be submitted in writing via email to Christine Murphy
cmurphy@longbeachny.gov.

Questions and Answers

1. Just to clarify addendum #3, the furniture listed for the dispatch office will be taken care of by the LBPD, but does that include the lockers? There are consoles, desks, a gun metal locker and a filing cabinet in addition to those lockers. I presumed, because lockers were included in the base bid for the bathrooms, it would be included for the dispatch office.

Response: The Dispatch Communications Center Add Alternate to be delivered as a "White Box" condition. Furniture, lockers, consoles, desks, gun metal locker, filing cabinets, etc. shall not be include in the pricing.

2. The mechanical drawings show steel dunnage for ACC-1 and says to refer to the structural drawings for details. However, structural drawings only show details for masonry work.

Response: No steel dunnage required for the project. The condensing unit shall be mounted on an industry standard roof curb. Typical Detail 6/S-501 shall be deleted.

End of Addendum No. 4

Receipt of Addendum No. 4

Acknowledged and Subscribed to:

Contractor Name: AFL General Construction

By: (sign in ink)



Title: Jim Marino, President



City of Long Beach

NEW YORK 11561

POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER INCLUDING LOCKER ROOM/BATHROOM UPGRADE

BASE BID – LOCKER ROOM/BATHROOM UPGRADE

Item Number	Item/Description with Price Written in Words	Lump Sum
1	General Requirements For: _____ Dollars _____ Cents _____	\$ _____
2	Demolition Work For: _____ Dollars _____ Cents _____	\$ _____
3	Architectural For: _____ Dollars _____ Cents _____	\$ _____
4	Masonry For: _____ Dollars _____ Cents _____	\$ _____
5	HVAC System For: _____ Dollars _____ Cents _____	\$ _____
6	Plumbing For: _____ Dollars _____ Cents _____	\$ _____
7	Electrical For: _____ Dollars _____ Cents _____	\$ _____
8. Allowance	Contingency – Base Bid For: _____ Dollars _____ Cents _____	\$10,000.00



City of Long Beach

NEW YORK 11561

TOTAL AMOUNT OF BASE BID ITEMS 1 THROUGH 8

In Figures: _____

In Words: _____

Bids will be compared on the basis of the TOTAL AMOUNT OF BASE BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

ADD ALTERNATE – POLICE DEPARTMENT COMMUNICATION CENTER

Item Number	Item/Description with Price Written in Words	Lump Sum
9	General Requirements For: _____ Dollars _____ Cents _____	\$ _____
10	Demolition Work For: _____ Dollars _____ Cents _____	\$ _____
11	Architectural For: _____ Dollars _____ Cents _____	\$ _____
12	Structural Steel For: _____ Dollars _____ Cents _____	\$ _____
13	Structural Concrete For: _____ Dollars _____ Cents _____	\$ _____
14	Masonry For: _____ Dollars _____ Cents _____	\$ _____
15	Plumbing For: _____ Dollars _____ Cents _____	\$ _____



City of Long Beach

NEW YORK 11561

Item Number	Item/Description with Price Written in Words	Lump Sum
16	Electrical For: _____ Dollars _____ Cents _____	\$ _____
17. Allowance	Contingency – Add Alternate Bid For: _____ Dollars _____ Cents _____	\$25,000.00

TOTAL AMOUNT OF ADD ALTERNATE BID ITEMS 09 THROUGH 17

In Figures: _____

In Words: _____

Bids will be compared on the basis of the TOTAL AMOUNT OF ADD ALTERNATE BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

GRAND TOTAL AMOUNT OF BID ITEMS 1 THROUGH 17

In Figures: _____

In Words: _____

Bids will be compared on the basis of the GRAND TOTAL AMOUNT OF BID. Where the price in figures differs from the price in words, the price in words will be accepted as the amount bid.

The Owner reserves the right to omit or add to the construction of any portion or portions of the work heretofore enumerated or shown on the plans.

Name of Bidder: _____

Address of Bidder: _____

Federal I.D. Number: _____

Telephone: _____

Signed by: _____

Title: _____

Date: _____



City of Long Beach

NEW YORK 11561

Work shall be completed within **90** Consecutive Calendar days after date of
Contract signing.

Name of Bidder _____

Address of Bidder _____

Federal I. D. Number _____

Telephone Number _____

Signed By _____

Title _____

Date _____

Vendor's Questionnaire must be included with Bid Document (see attachments)



City of Long Beach

NEW YORK 11561

PROPOSAL (Declaration)

Herewith is a Certified Check or Bid Bond for the following Contract (equal to at least ten percent (10%) of the Total Bid or Total Alternate Bid, whichever is the greater) in the amount of:

_____ (\$)

payable to the City of Long Beach, as a surety that the undersigned will enter into a contract for the work within ten (10) days of date of Notice of award of Contract. The undersigned proposes to commence work and order materials in accordance with the written "Notice to Proceed" and to complete the work in accordance with the following schedule and guarantees. The work performed and the materials furnished for a period of one (1) year after the final acceptance of the work. Bidder agrees to pay as liquidated damages, the sum of \$1,000.00 for each consecutive day thereafter.

The City of Long Beach reserves the right to award the contract to whichever bidder whose proposal results in the least cost to the City

No work shall be performed on Saturday, Sunday or Holidays, without the prior expressed approval of the Engineer.



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders)

Bidders are required to provide the following information. Bidders may attach additional sheets as needed.

1. Name of Bidder _____

2. Permanent Main Office Address, Including City, State And Zip Code:

3. Telephone Number () _____
Fax Number () _____
4. When Organized _____
5. If A Corporation, Where Incorporated _____

6. Description of General Character of Work Typically Bid By Firm:



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

7. Current Contracts on Hand:

Project Title and Location	Estimated Completion Time	Estimated Value	Reference Person/Inspector with Phone Number

8. Has the Firm ever failed to complete any Work? If so where and why?

9. Has the firm ever defaulted on a Contract? If So, Where And Why?



City of Long Beach

NEW YORK 11561

PROPOSAL (Qualifications of Bidders) Cont.

10. List recent Contracts that demonstrate experience germane to the project described herein:

Year	Project Name Location	Estimated Value	Description	Contact Person & Phone No.

11. List the Major Equipment available for this contract



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PROPOSAL (Qualifications of Bidders) Cont.

12. List All Principals and Officers and Relevant Experience of Each.

Name	Title	Experience

13. Give Primary Bank Reference and Credit Available:

Bank: _____

Address: _____

Credit Amount \$ _____

14. Will the firm, upon request, fill out a detailed financial statement dated within 30 days of the Bid date and furnish any other information that may be required by the City of Long Beach?



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PROPOSAL (Qualifications of Bidders) Cont.

- 15(a) Has the firm ever been a party to or otherwise involved in any action or legal proceeding involving matters related to race, color, nationality, sex or religion? If so, give full details.

- (b) Has the firm ever been accused of discrimination based upon race, color, nationality, sex or religion in any actions or legal proceeding? If so, give full details.

- (c) The City may make an investigation it deems necessary to assure itself of the ability of the Bidder to perform the work, including but not limited to obtaining a certified financial statement from the Bidder. The ability of any Bidder to obtain a performance bond shall not be regarded as the sole test of the Bidder's Competency, Reliability and Responsibility.

16. What percent of the proposed project will be performed by Subcontractor?

17. What specific activities are proposed for subcontractor involvement?

18. Is the firm currently or has the firm ever been disbarred from doing business in New York State?



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PROPOSAL (Declaration) cont'd

Name _____ Name _____

Name _____ Name _____

Name _____ Name _____

Bidder : _____

Bidder's Address _____

Signed By: _____

Title: _____

Corporate Seal



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PROPOSAL - (Declaration) Cont.

The undersigned acknowledges receipt of the following Addenda :

ADDENDUM NO. _____ DATE : _____

ADDENDUM NO. _____ DATE : _____

ADDENDUM NO. _____ DATE _____

The undersigned is a _____ (state whether single individual, or if a partnership, give names of all partners, or if a corporation, give names of principal officers).

Name _____ Address _____

Name _____ Address _____

Name _____ Address _____

Bidder: _____

Bidder's Address: _____

Signed By _____

Title: _____

Corporate Seal



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PROPOSAL (Declaration Cont.)

The undersigned is a joint venture, consisting of the following corporations:
(give names of all principal officers)

Name _____ Address _____

Bidder : _____

Bidder's Address : _____

Signed By : _____

Title : _____

Corporate Seal

Name _____ Address _____

Name _____ Address _____

Name _____ Address _____

Bidder : _____

Bidder's Address : _____

Signed By : _____

Title : _____

Corporate Seal



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PROPOSAL - Non-Collusive Bidding Certificate

Pursuant to Section 103-D of the General Municipal law, the Contractor makes the following statement under penalty of perjury and by submission of this bid or proposal the Bidder certifies that:

(a) This bid or proposal has been independently arrived at without collusion with any other Bidder or with any competitor or potential competitor; (b) this bid or proposal has not been knowingly disclosed and will not be knowingly disclosed prior to the opening of the bids or proposals for this project to any other Bidder, competitor or potential competitor; (c) no attempt has been or will be made to induce a bid or proposal; (d) the person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in his behalf; (e) that attached hereto (if a corporate bidder) is a certified copy of resolution authorizing the execution of his certificate by the signatory of this bid or proposal in behalf of the corporate bidder.

Resolved that _____ be
(Name of Corporation)
authorized to sign and submit the bid

or proposal of this corporation for the following project:

CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE

and to include in such bid or proposal the certificate as to non-collusion required by Section One Hundred Three-d of the General Municipal Law as the act and deed of such corporation, and for any inaccuracies or misstatements in such certificate this corporate Bidder shall be liable under the penalties of perjury.

The foregoing is a true and correct copy of the resolution adopted by

_____ corporation at a meeting of its Board of Directors held on the
____ day of _____, 20 _____. (Seal of the Corporation)

Secretary _____
Respectfully Submitted:
Firm Name: _____

Firm Address: _____
Signed By: _____



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CONDITIONS OF CONTRACT

1. Contract Documents and Definitions

The Notice to Bidders, Information for Bidders, Proposal, Form of Contract, Conditions of Contract, Contract Specifications and Contract Drawings, together with any Addenda, shall form part of this contract, the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The titles, headings, headlines and marginal notes contained herein are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light upon the interpretation of the provisions to which refer. Whenever the term "Contract Documents" is used, it shall mean and include this Contract, the Contract Drawings, Specifications, any Addenda, and the Notice to Bidders, Information for Bidders, Proposal and Conditions of Contract. In case of any conflict or inconsistency between the provisions of the Contract and those of the contract specifications, the provisions of this Contract shall govern.

2. Definitions

The following terms as used in these Contract Documents are respectively defined as follows:

- a. Owner or City - The term "Owner" or "City" shall mean the City of Long Beach and/or its authorized representatives.
- b. Engineer - The term "Engineer" shall mean the Commissioner of Public Works or his authorized representatives assigned to inspection of work materials.
- c. Contractor - A person, firm or corporation with whom this Contract is made by the City.
- d. Subcontractor - A person, firm or corporation supplying labor and materials or only labor for work at site of the project for, and under separate contract or agreement with, the Contractor.
- e. Apprentice - (1) A person employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau; or (2) a person in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training.



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CONDITIONS OF CONTRACT (Cont.)

- f. Trainee - A person receiving on-the-job training in a construction occupation under a program which is approved (but not necessarily sponsored) by the U. S. Department of Labor, Manpower Administration Bureau of Apprenticeship and Training, which is reviewed from time to time by Manpower Administration to insure that the training meets adequate standards.
- g. Work - The term "work" as used herein refers to all of the work proposed to be accomplished at the site of the project and all such other work as is in any manner required to accomplish the completed project and include all plant, labor, materials supplies, equipment and other facilities and acts necessary or proper for/or incidental to the carrying out and completion of the terms of this Contract. The term "work performed" shall be construed to include material delivered to and suitably stored at the site of the project.
- h. Extra Work - The term "extra work" as used herein refers to and includes all work required by the "City" which, in the judgment of the "Engineer", involves changes in or additions to work required by the Contract Plans, Contract Specifications and any Addenda in their present form.
- i. Notice - The term "notice", as used herein, shall mean and include written notice. Written notice shall be deemed to have been duly served when delivered to, or at the last known business address, of the person, firm or corporation for whom intended or to his, their, or its duly authorized agents, representatives, or officer, or when enclosed in a postage prepaid wrapper or envelope addressed to such person, firm or corporation at his, their or its last known business address and deposited in a United States mail box.
- j. Directed, Required Approved, Acceptable - Whenever they refer to the work, or its performance, "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import shall imply the direction, requirement, permission, order, designation or prescription of the Engineer, and "approved", "satisfied", or "satisfactory", "in the judgment of ", and words of like import, shall mean approved, or acceptable to or satisfactory to, in the judgment of the Engineer.



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CONDITIONS OF CONTRACT (Cont.)

3. Scope of the Work

The Contractor will furnish all plant, labor material, supplies, equipment and other facilities and things necessary or proper for, or incidental to, the work contemplated by this contract as required by and in strict accordance with the applicable Contract Plans, Contract Specifications and Addenda prepared by the Engineer and/or required by, and in strict accordance with, such changes as are ordered and approved pursuant to this contract by the Engineer, and will perform all other obligations imposed on him by this Contract.

4. Contractor's Title to Material

No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the work, free from all liens, claims or encumbrances.

5. Inspection and Testing of Materials

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Engineer. However, the Contractor will pay for all laboratory inspection service direct, as a part of the contract.

Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitable for users intended.

6. "Or Equal" Clause

Whenever a material, article or piece of equipment is identified on the proposed Contract document drawings or Specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended to establish a standard. Any material, article, or equipment of other manufactures and vendors which will precisely perform the duties imposed by the general design will be considered equally acceptable provided, the material, article, or equipment so proposed is in the opinion and discretion of the City's project engineer, of equal substance and function.



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CONDITIONS OF CONTRACT (Cont.)

Should a bidding contractor intend to substantially deviate or substitute established standards, a request for substitution must be submitted in writing to the City's project engineer with the contractor's bid package. All such requests for substitution must be accompanied by a complete set of descriptive technical data on the items proposed for substitution. The City, in its discretion, may request certification as to the adequacy, equality and functionality of the proposed substitute in performing comparable duties as the material or equipment specified. Such certification must be signed by a New York State licensed, professional engineer.

No substitutes of material article or equipment shall be made, purchased or installed by the contractor without the City project engineer's prior written approval.

7. Patents

The Contractor shall hold and save the City and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufacture or used in the performance of the contract, including its use by the City, unless otherwise specifically stipulated in the Contract Documents.

License or Royalty Fee: License and/or Royalty Fees for the use of a process which is authorized by the Engineer of the project must be reasonable, and paid to the holder of the patent, or his authorized license, direct by the City and not by and through the Contractor.

If the Contractor uses any design, device or materials covered by letters, patent or copyright, he shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood that, without exception, the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his Sureties shall indemnify and save harmless the City and its employees on the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract, and shall indemnify the City for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.



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CONDITIONS OF CONTRACT (Cont.)

8. Surveys, Permits and Regulations

Unless otherwise expressly provided for in this Contract, the City will furnish to the Contractor all surveys necessary for the execution of the work. The Contractor shall procure and pay for all permits, licenses and approvals necessary for the execution of this contract. The Contractor shall comply with all laws, ordinances, rules, orders, and regulations relating to performance of the work, the protection of adjacent property, and the maintenance of passageways, guard fence or other protective facilities.

9. Contractor's Obligations

The Contractor shall and will, in a good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract and said Contract Specifications and in accordance with the Contract Drawings covered by this Contract and any and all supplement plans and drawings, and in accordance with the directions of the Engineer as given from time to time during the progress of the work. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the contract and specifications, and shall do, carry on, and complete the entire work to satisfaction of the Engineer.

10. Weather Conditions

In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor will, and will cause his subcontractor to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

11. Protection of Work and Property - Emergency

The Contractor shall at all times safely guard the City's property from injury or loss in connection with this contract. He shall at all times safely guard and protect his own work, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in the Contract or by the City, or his duly authorized representative.



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CONDITIONS OF CONTRACT (cont)

In case of an emergency which threatens loss or injury of property and/or safety of life, the Contractor will be allowed to act, without previous instructions from the Engineer, in a diligent manner. He shall notify the Engineer immediately thereafter.

Where the Contractor has not taken action but notified the Engineer of an emergency threatening injury to persons or damage to the work or any adjoining property, he shall act as instructed or authorized by Engineer.

12. Inspection

The authorized representatives and agents of the City shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

13. Reports, Records and Data

The Contractor shall submit to the City such schedule of quantities and costs, progress schedules, reports, estimates, records and other data as the City may request concerning work performed under this contract.

14. Superintendence by Contractor

At the site of the work, the Contractor shall employ a construction superintendent or foreman who shall have full authority to act for the Contractor. It is understood that such representative shall be acceptable to the Engineer.

15. Changes in Work

No changes in the work covered by the approved contract document shall be made without having prior written approval of the City. Charges or credits for the work covered by the approved change shall be determined by one or more, or a combination of the following methods:

- a. Unit bid prices previously approved.
- b. An agreed lump sum.
- c. If no such unit prices are so set forth and if the parties cannot agree upon a lump sum, then the cost will be determined by the actual cost of labor and materials plus overhead and profit, cost to be determined as the Work progresses in the manner specified hereinafter:



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The following subparagraphs (i) through (v) are applicable for calculating the fair value of the extra work performed as defined in the above paragraphs 15.b and 15.c.

- i. Overhead shall be defined as an allowance to compensate for all costs, charges and expenses, direct or indirect, except for the actual cost of labor and material as defined by paragraph (ii). Overhead shall be considered to include, but not limited to insurance (other than as mentioned in paragraph (ii)), Bond or Bonds, field and office supervisors and assistants above the level of foreman, use of small tools and minor equipment, incidental job burdens, general office expense, etc.
- ii. Actual cost of labor and material shall be defined as the amount paid for the following items, to the extent determined reasonable and necessary:



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Item 1 – Cost of materials delivered to the job site for incorporation into the contract work.

Item 2 – Wage paid to workmen and foremen and wage supplements paid to labor organization in accordance with current labor agreements.

Item 3 – Premiums or taxes paid by the contractor for workmen's compensation insurance , unemployment insurance, FICA tax and other payroll taxes as required by law, net of actual and anticipated refunds and rebates.

Item 4 – Sales taxes paid as required by law.

Item 5 – Allowance for use of construction equipment (exclusive of hand tools and minor equipment

) as approved for use by the Engineer. The rate on self-owned equipment used for periods of under one week will be Associated Equipment.

Distributor's published monthly rate divided by twenty –two (22) days to establish a daily rate and divided again by eight (8) hours to establish an hourly Rate.

Equipment used for periods of five (5) days or more will be billed at a daily rate equal to forty-five percent (45%) of the published monthly rate divided by twenty-two (22) days.

In the alternative, the engineer may approve for reimbursement a rate representing the allocable costs of ownership. Self-owned equipment is defined to include equipment rented from controlled or affiliated companies. Rented equipment will be paid for at the actual rental cost. Gasoline, oil and grease required for operation and maintenance will be paid for at the actual cost. When, in the opinion of the contractor, and as approved by the engineer, suitable equipment is not available on the Site, the moving of said equipment o and from Site will be paid for at actual cost

Item 6 – When the material furnished under Item 1 is used material, its value shall be pro-rated to the value of new material, but shall not exceed the materials initial cost. When, in the opinion of the Engineer, the salvage value of salvageable material furnished under Item 1 exceeds the cost of salvage, a suitable credit should be given to the City.



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iii. Regardless of the method used to determine the value of any change, the contractor will be required to submit evidence satisfactory to the Engineer to substantiate each and every item that constitutes his proposal of the value of the change. The amounts allowed for overhead and profit shall not exceed the applicable percentages as established in the following paragraphs.

d. The amount of compensation for extra work determined as described in paragraph B, shall be construed to include the total cost for extra work, both direct and indirect.

16. Overhead and Profit

To the cost under 15c, there shall be added a fixed fee to be agreed upon. The fee shall in no case exceed twenty (20) percent of the items listed in 15c, and this compensation shall represent cost of supervision, overhead, bonds, insurance, profit and all other general expenses. Profit and overhead shall not be paid on the premium portion of overtime or on payroll taxes.

In the event that the additional work is performed by an approved sub-contractor, the sub-contractor can claim a maximum of twenty (20) percent profit and overhead. The Contractor, however, will only be entitled to a maximum of ten (10) percent combined overhead and profit on the agreed upon sub-contractor amount.

17. Extra Work

The City may, at any time, and without notice to the sureties, require extra work. The Contractor shall perform such extra work and furnish such additional materials which, in the opinion of the Engineer, are necessary or advisable for the proper completion of the work. All extra work and materials shall be ordered in writing by the Engineer, and in no event shall any such work or materials be paid for unless so ordered. In the absence of such prior approval, all claims for such work or materials, shall be absolutely waived by the Contractor and the City shall not be required to allow payment for the same or for any part thereof.

The Contractor further agrees that he will perform such extra work with all reasonable diligence and will employ thereon competent men at least equal to the average of the class of men employed under this Contract upon work of similar character. The Contractor agrees to give the Engineer access to all accounts, bills, payrolls, and vouchers relating to extra work not covered by the Contract price, and he agrees that he shall have no claim for compensation for such work, unless a statement in writing of the actual cost of the same fully itemized as to labor and materials, is presented to the Engineer before the fifteenth (15th) day of the month following that during which such specific order was complied with by him.



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18. Time for Completion and Liquidated Damages

It is hereby understood and mutually agreed, by and between the Contractor and City, that the date of beginning and the time for completion as specified in the Contract are essential conditions of the Contract and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date specified in the Notice to Proceed.

The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the City that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the City, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay the City the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

The Contractor agrees that he shall order all materials and commence work within ten (10) consecutive calendar days after date specified in Notice to Proceed.

The rate of progress of the work shall be such that the whole work shall be performed in accordance with the Contract Documents and in no event later than the time specified therein, unless an extension of this time shall have been made in the manner herein provided.

The time of completion of this Contract shall be as indicated on the Proposal Sheets and the date of such completion shall be the date of the certificate of completion hereinafter specified.

The City reserves the right to order the Contractor to suspend operations when, in the opinion of the Engineer, improper weather conditions make such advisable, and to order the Contractor to resume operations when weather and ground conditions permit. The days during which such suspension of work is in force are not charged against the specified completion time.



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19. Progress Schedule

To enable the work to be laid out and prosecuted in any orderly and expeditious manner, the Contractor, within 15 days after the execution of this Contract, unless otherwise directed by the Engineers, shall submit to him a proposed progress schedule, showing the anticipated time of commencement and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer, until finally approved by them and after such approval shall be strictly adhered to by the Contractor unless changed as provided for in the following paragraph.

Within ten days after receiving notice of any change in the Contract or any extra work to be performed or of any other conditions entirely beyond the control of the Contractor which are likely to cause or are actually causing delays , the Contractor shall notify the Engineer in writing of the effect, if any, of such change or extra work or suspension or other conditions upon the previously approved progress schedule and shall state in what respects, if any, the schedule should be revised with the reasons therefore. These proposed changes in the progress schedule shall be revised by the Contractor as directed by the Engineer, until approved by them and as so approved the revised schedule must be strictly adhered to by the Contractor. If the Contractor shall fail to adhere to the approved progress schedule or to the schedules as revised, he must promptly adopt such other or additional means and methods of construction as will make up for the time lost and will assure completion of the work in accordance with such schedule.

20. Extensions of Time

1. It is mutually agreed that no extension beyond the date of completion fixed by the Terms of the contract shall be effective unless consented to in writing by the Commissioner of Public Works. An application by the Contractor for extension of time must be in writing, setting forth in detail the reasons and causes of delay and the date upon which each such cause of delay began and ended and must be submitted to the Commissioner within 10 days after the start of the alleged delay. If the Commissioner should determine that the delay was not due to any act or omission on the part of the Contractor or was due to causes beyond the control of the Contractor, the Contractor shall be entitled to an extension of time equal to the number of days actually delayed if such extension shall be required.



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If, however the Commissioner should determine that the delay was caused directly or indirectly by the act or conduct of the Contractor or any of his sub-contractors or suppliers, the Commissioner may refuse to grant an extension of time and direct the contractor to re-arrange his progress schedule so as to complete the work within the time set forth in the contract.

2. If the Commissioner deems it advisable and expedient to have the contractor complete and finish the work after the expiration of the contract date of completion , an in order that the City fiscal officers may be permitted to make payment to the Contractor for work performed beyond the completion date, the Commissioner will grant an extension of time necessary to complete the work, conditional upon the assessment and deduction of liquidated damages from the monies which may become due hereunder.
3. In the event of delay for any cause, the Contractor's sole remedy shall only be the extension of time granted as herein above provided, and the Contractor shall have no right to, or cause of, action for damages or additional costs resulting from any such delay.
4. Time necessary for review by the City of shop drawings and delays incurred by normal seasonal and weather conditions should be anticipated and are neither compensatory nor eligible for extensions of time.

21. Liquidated Damages for Delay

The time limit being essential to and of the essence of this contract, the Contractor hereby agrees that the City shall be, and is hereby authorized to deduct and retain out of the money which may be due or may become due to said Contractor under this Agreement, the sum of one thousand (1,000) Dollars per calendar day, which amount is hereby agreed upon, fixed and determined by the parties hereto as the liquidated damages, including overhead charges, services, inspector's wages and interest on the money invested that the City will suffer by reason of such default, for each and every day during which the aforesaid work may be incomplete over and beyond the time herein stipulated for its completion provided, however, that the City shall have the right to extend the time for the completion of said work.



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CONDITIONS OF CONTRACT (Cont.)

22. Correction of Work

All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Engineer who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture, and methods of construction for the purposes for which they are used. Should they fail to meet his approval they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case maybe, by the Contractor at his own expense. Rejected materials shall immediately be removed from the site. If, in the opinion of the Engineer, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the contract documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the Engineer shall be equitable.

23. Subsurface Conditions Found Different -

Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the Contract Plans or indicated in the Contract Specifications, he shall immediately give notice to the Engineer of such conditions before they are disturbed. The Engineer will thereupon promptly investigate the conditions, and if he finds that they materially differ from those shown on the Contract Plans or indicated in the Contract Specifications, he will at once make such changes in the Contract Plans and Contract Specifications as he may find necessary, and any increase or decrease of cost resulting from such changes to be adjusted in the manner provided in paragraph 15 of these Conditions of Contract.

24. Claims for Extra Costs

No claim for extra work or cost shall be allowed unless the same was done in pursuance of a written order of the Engineer, as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When work is done under the terms of paragraph 15(c) of the Conditions of Contract, the Contractor shall furnish satisfactory bills, payrolls, and vouchers covering all items of cost and, when requested by the Engineer give the Engineer access to accounts relating thereto.



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CONDITIONS OF CONTRACT (Cont.)

25. Right of the Owner to Terminate Contract

In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his subcontractors, the City may serve written notice upon the Contractor and the Surety of its intention to terminate, such notices to contain the reasons for such intention to terminate the Contract, and unless within ten (10) days after the serving of such notice upon the Contractor, such violations or delay shall cease and satisfactory arrangement or correction is made, the Contractor shall, upon the expiration of said ten (10) days, cease and terminate. In the event of any such termination, the City shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to take over and perform the contract; provided, however, that if the Surety does not commence performance thereof within ten (10) days from the date of the mailing to such Surety of notice of termination, the City may take over the work and prosecute the same to completion by Contract or by force account at the expense of the Contractor, and the Contractor and his Surety shall be liable to the City for any excess cost occasioned by the City thereby, and in such event the City may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the site and necessary therefore.

26. Estimates and Payments

a. Monthly: At the end of each calendar month during the progress of the work, the Contractor shall make up an approximate estimate of the work done and the materials furnished, based upon the prices set forth in the Proposal. Duly certified copies of such certificates of payment shall be submitted to the Engineer for approval. In consideration of the work done and the materials furnished, the City will pay or cause to be paid to the Contractor the amount approved as due him, less five percent (5%) of each progress payment less an amount necessary to satisfy any claims, liens or judgments against the contractor which have not been suitably discharged, all in accordance with Section 106-b of the N.Y.S. General Municipal law latest revision. The making and approval of any such estimates or payments made thereon shall not be taken or construed as an acceptance by the Engineer, or the City of any work so estimated and paid for. The monthly estimate remaining unpaid will be retained by the City as a guarantee that the Contractor will faithfully and completely fulfill all obligations imposed by the Contract and Specifications, and against any damages caused the City by reason of any failure on the part of the Contractor to fulfill all conditions and obligations herein contained. All partial payments are subject to correction in any subsequent payment.



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CONDITIONS OF CONTRACT (Cont.)

All material and work covered by partial payments made shall thereupon become the sole property of the City, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the City to require fulfillment of all of the terms of the Contract.

b. **Final Certificate:** One month after the time of completion and acceptance of the work as specified and contracted for, the Contractor will make a final certificate of all work done. Upon approval of such final certificate by the Engineer, the City will pay the full amount less the five percent retained percentage, for one year, less any prior payments, less any money paid by the City by reason of said Contractor having failed to carry out faithfully and completely all the obligations and the requirements contained herein.

c. **Maintenance Bond:** If a Maintenance Bond is deemed acceptable and a condition of the Contract Forms, the City will pay the Contractor the full amount of the Contract as previously described upon receipt of a Maintenance Bond in a form acceptable to the City. If a Maintenance Bond is not specified then the City in order to secure the performance of the covenant of the Contractor, the City shall retain during the period of one year from the date of the said final certificate, an amount equal to five percent (5%) of the said final certificate. If, at the end of the said period of one year, the Contractor shall have fulfilled said covenant to the satisfaction of the Engineer, the said percentage shall then be paid to the Contractor. No interest shall be allowed the Contractor on retained percentages.

Upon final settlement, according to the conditions herein specified and not until such settlement shall have been made will the Contractor be relieved from the obligations assumed in the contract.



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The Contractor agrees that he will indemnify and save the City harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. The Contractor shall, at the City's request, furnish satisfactory evidence that all obligations of the nature herein above designated have to be paid, discharged, or waived. If the Contractor fails to do so, then the City may, after having served written notice on the said Contractor, either pay unpaid bills, of which the City has written notice, direct or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the City to either the Contractor or his surety.

In paying any unpaid bills of the Contractor, the City shall be deemed the agent of the Contractor, and any payment so made by the City, shall be considered as a payment made under the contract by the City to the Contractor, and the City shall not be liable to the Contractor for any such payment made in good faith. The Maintenance Bond shall be for the final contract value.

d. **Measurement for Payment:** The Engineer or his representative shall make due measurement of the work done during the progress of the work and his estimate shall be final and conclusive evidence of the amounts of work performed by the Contractor under and by virtue of this agreement and shall be taken as full measure of compensation to be received by the Contractor. When requested by the Contractor, the Engineer shall measure, re-measure and re-estimate any portion of the work, but the expense of such re-measurement or re-estimating shall, unless material error be proved, be paid for by the Contractor.

27.

Acceptance of Final Payment Constitutes Release

The acceptance by the Contractor of the final payment shall be and shall operate as a release to the City from all claims and all liabilities to the Contractor for all things done or furnished in connection with this work and for every act and neglect of the City and others relating to, or arising out of, this work, excepting the Contractor's claims for interest upon the final payment, if this payment be improperly delayed. No payment, however, final or otherwise shall operate to release the Contractor or his sureties from any obligations under this contract or performance bond.



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28. Final Certification by Contractor

The contractor will be required to certify upon completion of all work and/or services that all outstanding claims for labor, services, materials and equipment incurred during the course of the work have been satisfied. The contractor will, further, release the City of Long Beach from any liability regarding any claims that may arise subsequent to this certification.

The contractor's certification shall be submitted with the final payment voucher and shall be submitted in a form consistent with the attached prototype. This document must be prepared on the Contractor's letterhead and must be properly notarized.



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CONDITIONS OF CONTRACT (Cont.)

Your Letterhead

Date

Department of Public Works
City of Long Beach
City Hall
One West Chester Street
Long Beach, N.Y. 11561

Re:

Gentlemen:

We certify that all work has been performed and material supplied in full accordance with the terms and conditions of the contract documents between the City of Long Beach and

We further certify that all outstanding claims for labor, services, materials and expended equipment employed in the performance of said contract have been paid in full, in accordance with the requirements of said contract.

The acceptance of final payment by your firm name shall be and shall operate as a release to the City of Long Beach of all claims and all liability to the City for all things done or furnished in connection with this work and for every act and neglect of the City of Long Beach and other relating to or arising out of this work.

Very Truly Yours

Notarized



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CONDITIONS OF CONTRACT (Cont.)

29. Payments by Contractor

The Contractor shall pay (a) for all transportation and utility services not later than 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools and other expendable equipment to the extent of 95% of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of each subcontractors interest therein.

30. The City's Right to Withhold Payments

The City may withhold from the Contractor so much of any approved payments due him as may, in the judgment of the City, be necessary:

- a. to assure the payment of just claims then due and unpaid of any persons supplying labor or materials for the work;
- b. to protect the City from loss due to defective work not remedied, or
- c. to protect the City from loss to injury to persons or damage to the work or property of other Contractors or subcontractors or others, caused by the act or neglect of the Contractor or any of his subcontractors. The City shall have the right as agent for the contract to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payment for the account of the Contractor.

31. Contractor's Insurance

General Requirements

- a. Insurance coverage shall be provided only by an insurance carrier rated A-, Class VII or better throughout the term of this contract. Such carrier shall be duly licensed in the State of New York.



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- b. All insurance coverage shall be written such that the Municipal representative is afforded at least thirty (30) days prior notice of cancellation of any insurance. No policy shall be changed by endorsement without the knowledge and consent of the municipal representative, and, in particular, any notice of cancellation by the insurer shall not be effective until (30) days after the said notice is actually received by the Municipal representative.
- Any notice shall be addressed to the Municipal representative and shall be mailed via certified or registered mail.
- c. Before commencing the work, the Contractor shall furnish to the Municipal representative a certificate of insurance showing that the Contractor has complied with this clause. In addition, for policies expiring on a fixed date before final acceptance, certificates of insurance showing their renewal must be filed not less than thirty (30) days before such expiration dates.
- d. Contractor shall notify the Municipality of any accidents and/or claims, including without limitation accidents or claims involving bodily injury, death, or property damage, arising on or within the premises. Such notice shall be provided in writing as soon as practicable, however in any event within five (5) days of contractor's receipt of notice of the accident or claim.

Contractor shall procure and maintain without interruption, at its sole cost and expense, during the term of this contract, (or any extension thereof) and for a period of two (2) years thereafter, insurance of the type, and with limits and deductibles, as follows:

Commercial General Liability Insurance and Excess Liability Insurance.

Providing both bodily injury (including death) and property damage insurance with limits in the aggregate and per occurrence in accordance with the following table:

Construction Contract Value	Commercial General Liability in combination with Excess (Umbrella) Liability	
	Each Occurrence	General Aggregate
< \$10M	\$2,000,000	\$2,000,000
>\$10M - \$50M	\$5,000,000	\$5,000,000
>\$50M	\$10,000,000	\$10,000,000

Such insurance is to be written on an occurrence basis with the municipality named as an additional insured. The minimum required level of insurance may be provided through a combination of commercial general liability and umbrella and/or excess liability policies.



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- i. Automobile Liability and Property Damage Insurance. In an amount not less than One Million Dollars (\$1,000,000) combined single limit for both Bodily Injury and Property Damage.
 - ii. Professional Liability. If the Contractor is engaged in providing professional services under this Contract, professional errors and omissions coverage with a limit not less than Two Million Dollars (\$2,000,000) in the aggregate and One Million Dollars (\$1,000,000) per occurrence. If the Contractor is not engaged in providing professional services under this Contract, this professional errors and omissions coverage is not required.
- b. In addition to the foregoing, Contractor and any subcontractors shall procure and maintain any and all insurance which is required by any applicable current or future law, rule, regulation, ordinance, permit, license, order or other legal requirement.

Required Coverage- The Contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and such insurance has been approved by the owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until the subcontractor has obtained the same insurance. **In all cases, the insurance provider must be a licensed carrier in New York State.** The required insurance coverage is as follows:

- a. Workmen's Compensation Insurance - in accordance with the law of the State of New York.



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- b. Comprehensive General Liability Insurance - to protect the Contractor and any subcontractor performing work in connection with this contract from any claims for damages for bodily injury (personal injury, sickness or disease, including death resulting there from, as well as injury claimed to be sustained resulting from false arrest, detention and/or imprisonment, malicious prosecution, libel, slander and/or wrongful entry), as well as from claims for property damage which may arise from operations connected with this contract, by anyone directly or indirectly employed by either of them and the amounts of such insurance shall be as follows:
 - i) \$2,000,000 each person.
 - ii) \$2,000,000 each occurrence.
 - iii) **Excess Liability: Minimum \$2,000,000**
- c. Owner's Protective Liability Insurance - to protect the Owner from claims arising from the operations of the Contractor and its subcontractors for damages for personal injury and property damage as defined above and for amounts specified above. In addition, the policy shall contain the following provisions:
 - i) The presence of the Owner's Engineer or representative on the site of the work shall not invalidate the policy of insurance.
 - ii) The policy shall not be invalidated by reason of any violation of any of the terms of any policy issued to the Contractor.
- d. Special Hazards Insurance: Public Liability Insurance for automobiles and trucks covering claims arising from bodily injury and property damage in amounts specified above.
- e. Contractual Liability Insurance covering the liability assumed by the Contractor under this Contract requiring him to indemnify and save harmless the City and Engineer from claims due to accidents causing injury to destruction of property, Including the loss of the use thereof, in amounts specified above for Comprehensive General Liability Insurance.



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- f. **Explosion, Collapse and Underground Damage (XCU) Insurance:** In addition to the Comprehensive General Liability Insurance and the owner's protective Liability Insurance required in sub-paragraph (b) and (c) above, the Contractor shall expand his coverage to include Explosion, Collapse and Underground damage Insurance to protect the Contractor, the City and the Engineer from claims for damages for personal injury and property damage resulting from excavation, pile and sheeting installation, pumping and related operations. Coverage under this XCU policy shall be for the amounts specified in sub-paragraph 28b. above under Comprehensive General Liability Insurance.
- g. **Personal Injury Liability Insurance** - to protect the City and Engineer from claims arising from the employees of the Contractor and his sub-contractors for damages of personal injury being described as willful torts, to wit: false arrest, detention and/or imprisonment, malicious prosecution, libel, slander and/or defamation of character, invasion of privacy, wrongful eviction and/or wrongful entry; for the amounts specified under the Comprehensive General Liability Insurance.
- h. **"Hold Harmless" and Indemnity:** The parties to this agreement specifically and without ambiguity agree that they shall hold the City harmless and provide complete indemnity to the City for any and all claims and suits for personal injury, property damage, including Contractor's property, contamination of or adverse effects on the environment, and injuries to or death of persons including the City's or Contractor's employees, other tort or Contract, which may be brought against the City of Long Beach (including wrongful death or any other claim).

In addition, the Contractor shall indemnify the City for any actual, alleged or threatened environmental condition, damage, liability, or legal or permit violation associated with any City of Long Beach municipal waste, to the extent that actual, alleged or threatened environmental condition, damage, injury or legal or permit violation occurs after title to such waste passes to the Contractor.

This complete and absolute duty to indemnify the City shall apply in any instance in which any person shall allege that the other parties to the Contract were involved or connected in any manner with the damages alleged by the claimant, regardless of whether the claimant's claims, or alleged manner of involvement of the parties with the claims, shall have any merit.



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To avoid any problem of interpretation, parties agree that the mere allegation on the part of a claimant that the City was connected in any manner with the claim shall trigger the other parties duty to provide legal defense and indemnity to the City.

- I. This duty to indemnify the City shall apply even if it should be proven or adjudicated that the City's negligence was the sole proximate cause of the claimant's loss.

In order to protect the general public and claimants in general, the other parties to this agreement shall purchase a contract of general liability insurance (amounts of coverage specified elsewhere in this agreement naming the City of Long Beach as an additional insured). The General Liability policy shall include Contractual Liability and the certificate of insurance shall reflect the same.

In the event that a claim arises against the City which is connected in any way with the other parties to this agreement, then the other parties agree to be liable to the City for the full indemnity for any judgment rendered against the City, including the costs of defense of this claim.

For the purpose of determining which claims against the City shall be indemnified by the other parties, the following shall apply:

Claims arising out of:

1. any performance directly called for by this agreement
2. any performance by a party which is necessarily related to performance under this agreement
3. any act of any employee of a party in the scope of his employment
4. any claim arising out of the physical condition of the premises, its fixture and appurtenances
5. any condition of any item or object on the premises
6. the actual, intended or permitted use of the premises
7. the condition of any sidewalk or walkway, curb or gutter or physical walking surface of any kind located within twenty feet of the vertical surface of any structure used by the other parties



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8. the condition of any street or sidewalk of other walking surface within the area in which the parties perform work under this agreement shall be subject indemnification by the other parties.

The intention of the parties, for purposes of further clarification, is that because the parties are providing for insurance coverage for the benefit of all parties, all the other parties to this agreement waive any claim for contribution or indemnity against the City in any claim for damages brought by a claimant.

In the event of any ambiguity as to whether a particular claim requires the other parties to this agreement to indemnify the City, the parties agree that all ambiguities shall be resolved in favor of indemnification to the City.

In the event of any conflict between this indemnification clause and any other portion of this agreement, this indemnification clause shall supersede the conflicting provisions.

- i. Limitation of Liability - The Contractor and all sub-contractors agree to limit the liability of the CITY and ENGINEER, due to the Engineer's professional negligent acts, errors, or omissions, such that the total aggregate liability of the Engineer to those named shall not exceed Fifty Thousand Dollars (\$50,000), or 5% of the contract award amount, whichever is greater.
- j. Cost and Proof of Carriage of Insurance - The Contractor shall furnish the City with copies of all insurance policies, each of which shall contain the following provisions:
“Such insurance shall not be canceled, terminated, modified or changed by either Contractor or Insurance Company, except on thirty (30) days prior written notice sent by the Insurance Company via certified mail to the City of Long Beach, Department of Public Works.”

**NOTE: POLICIES SHALL DELINEATE “THE CITY OF LONG BEACH”,
UNDER THE NOTATION FOR ADDITIONAL INSURED.**



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32. Contract Security

The Contractor shall furnish a performance bond in an amount at least equal to one hundred percent (100%) of the Contract price as security for the faithful performance of this Contract and also a payment bond in an amount equal to one hundred percent (100%) of the Contract price or in a penal sum not less than that prescribed by the State, territorial or local law, as security for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract. The surety company shall be authorized to do business in the State of New York and approved by the City. The Performance Bond and the Payment Bond may be in one or in separate instruments in accordance with local law. Before final acceptance, each bond must be approved by the City.

32. Additional or Substitute Bond

If at any time the City for justifiable cause, shall be or become dissatisfied with the Surety or Sureties for the Performance and /or Payment Bonds, the Contractor shall within five (5) days after notice from the City to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other Surety or Sureties as may be satisfactory to the City. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new Surety or Sureties shall have furnished such an acceptable bond to the City.

33. Assignments

The Contractor shall not assign the whole or any part of this contract or any moneys due or to become due hereunder without written consent of the City. In case the Contractor assigns all or any part of the moneys due or to become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this contract.



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34. Separate Contracts

The Contractor shall coordinate his operations with those of other Contractors. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the work. The Contractor, including his sub-contractors, shall keep informed of the progress and the detail work of other Contractors and shall notify the Engineer immediately of lack of progress or defective workmanship on the part of other Contractors. Failure of a Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him of the status of the work as being satisfactory for proper coordination with his own work.

35. Subcontracting

The Contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

The Contractor shall not award any work to any subcontractors without prior written approval of the City, which approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor, which statement will contain such information as the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of his subcontractor, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the Conditions of Contract and other contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the City may exercise over the Contractor under any provision of the Contract Documents.

Nothing contained in this Contract shall create any contractual relation between any subcontractor and the City.



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36. Authority of the Engineer

In the performance of the work, the Contractor shall abide by all orders and directions and requirements of the Engineer, and shall perform all work to the satisfaction of the Engineer, at such time and places, by such methods, and in such manner and sequence as he may require. The Engineer shall determine the amount, quality, acceptability, and fitness of all parts of the work, shall interpret the plans, specifications, contract documents and any extra work orders and shall decide all other questions in connection with the work. Upon request, the Engineer shall confirm in writing any oral orders, directions, requirements or determinations. The enumeration herein or elsewhere in the contract documents or particular instances in which the opinion, judgment, discretion or determination of the Engineer shall control or in which work shall be performed to his satisfaction or subject to his approval, or inspection, shall not imply that only matters similar to those enumerated shall be so governed and so performed, but without exception all the work shall be governed and so performed.

37. Inspection and Tests

All material and workmanship shall be subject to inspection, examination and test by the Engineer and other representatives of the City at any time during the construction and at any and all places where manufacturing of materials used and/or construction is carried on.

Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and materials necessary to make tests so required safe and convenient.

If at any time before final acceptance of the entire work, the Engineer considers necessary or advisable an examination of any part of the work already completed, by removing or tearing out the same, the Contractor shall, upon request, furnish promptly all necessary facilities, labor and materials for such examination. If such work is found to be defective in any material respect, due to the fault of the Contractor or any subcontractor, or if any work shall be covered over without the approval or consent of the Engineer, whether or not the same shall be defective, the Contractor shall be liable for the expense for such examination and satisfactory reconstruction.

If, however, such approval and consent shall have been given and such work is found to meet the requirements of this contract, the Contractor shall be compensated for the expense of such examination and reconstruction in the manner herein provided for the payment of costs of extra work.



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The selection of laboratories and/or agencies for the inspection and tests of supplies, materials or equipment shall be subject to the approval of the Engineer. Satisfactory documentary evidence that the material has passed the required inspection and tests must be furnished the Engineer prior to the incorporation of material in the work. Results of all tests shall be sent directly to the Engineer by the testing laboratories and/or agencies.

Any rejected work shall be removed from the site of the project completely at the expense of the Contractor.

38. National Historic Preservation Act of 1966

The Contractor agrees to contribute to the preservation and enhancement of structures and objects of historical, architectural, or archaeological significance when such items are found and/or unearthed during the course of project construction and to consult with the State Historic Preservation Officer for recovery of the items. [Reference: National Historic Preservation Act 1966 (80 Stat 915, 16 USC 470) and Executive Order No. 11593 of May 31, 1971].

39. Waiver of Immunity -

The Contractor states that he is familiar with the provisions of Article 5-A, Chapter 94, of the General Municipal law of the State of New York, as amended by Chapter 751, Section 1, of the Laws of 1965, and particularly with Sections 103-A and 103-B thereof.

The Contractor states that he is aware that under the provisions of said sections his refusal when called before a Grand Jury to testify concerning this transaction or other transactions had with the City or to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transactions or contracts shall thereafter disqualify the Contractor from receiving awards or entering into any contracts with any municipal corporation, fire district, public department, agency or offices thereof for goods, work or services for a period of five (5) years after such refusal.

Failure of the Contractor to waive immunity gives the City the right to cancel or terminate this Contract without the City incurring any penalty or damages on account of such cancellation or termination.



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CONDITIONS OF CONTRACT (Cont.)

40. Suits at Law

The Contractor shall indemnify and save harmless the City from and against all suits, claims, demands, or actions for any injury sustained by any party or parties in connection with the construction of the work or any part thereof or any commission or omission of the Contractor, his employees or agents or any subcontractor and in case of any such action shall be brought against the City, the Contractor shall immediately take charge of and defend the same at his own cost and expense.

41. Provisions Deemed by Law

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted or is not correctly inserted then, upon the application of either party, the contract shall forthwith be physically amended to make such insertion.

42. Use of Premises and Removal of Debris

The Contractor expressly undertakes at his own expense:

- a. To take every precaution against injuries to persons or damage to property;
- b. To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other Contractors;
- c. To place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work;
- d. To clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the work shall present a neat, orderly, and workmanlike appearance;
- e. Before final payment to remove all surplus materials, falsework, temporary structures, including foundations thereof, plant of any description and debris of any nature resulting from his operations, and to put the site in a neat, orderly condition;
- f. To effect all cutting, fitting or patching of his work required to make the same to conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other Contractor.



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CONDITIONS OF CONTRACT (Cont.)

43. Land and Rights-of-Way

Prior to the start of construction, the City shall obtain all land rights-of-way necessary for the carrying out and completion of work to be performed under this Contract.

44. General Guaranty -

Neither the final certificate of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the City shall constitute an acceptance of work not done in accordance with the Contract documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damages to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of work unless a longer period is specified. The City will give notice of observed defects with reasonable promptness.

45. Conflicting Conditions

Any provision in any of the contract documents which may be in conflict or inconsistent with any of the paragraphs in these Conditions of Contract shall be void to the extent of such conflict or inconsistency.

46. Notice and Service Thereof

Any notice to any Contractor from the City relative to any part of this contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted, by certified mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the work.

47. Safety and Health Regulations for Construction

In order to protect the health and lives of his employees under the contract, the Contractor shall comply with all pertinent provisions of the Contract Work Hours and Safety Standards Act, as amended, commonly known as the Construction Safety Act as pertains to health and safety standards; and maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the contract.



City of Long Beach

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FORM OF CONTRACT

Agreement made this _____ day of _____, 2024, by and between the City of Long Beach, Nassau County, New York, (hereinafter called the "City"), party of the first part, and AFL GENERAL CONTRACTING INC

with _____ legal address at _____
36 COMMERCIAL DR.

FARMINGDALE
County of NASSAU, State of NEW YORK, (Hereinafter called the
"Contractor"), party of the second part.

Contractor agrees to furnish all labor and materials for:

**CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE**

as shown on the contract plans or specified in the contract specifications made by :
AI-ALT Design Engineering Consultants dated October 31, 2024

and entitled- **CITY OF LONG BEACH
POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER
INCLUDING LOCKER ROOM/BATHROOM UPGRADE**



City of Long Beach

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FORM OF CONTRACT (Cont.)

- b. The Contractor agrees to complete and perform all work in the most thorough workmanlike and substantial manner in every respect to the satisfaction and approval of the City's Engineer, or Engineers, (hereinafter referred to as the "Engineer") in the manner and within the time hereinafter limited, and in strict accordance with the contract, and with the Information for Bidders, Proposal, and Contract.

Specifications and the General Conditions hereto attached, and the plans therein referred to, and under the penalty expressed in the Bond referred to herein, which said information, Proposal, Specifications, Clauses, Plans, and Bond are hereby made part of this Contract as if the same were repeated at length herein.

- c. The Contractor agrees that the City shall be authorized to retain out of monies payable to said Contractor a sum equal to five percent (5%) of the final certificate for payment under this Contract for the guarantee of the making of any necessary repairs to the work for a period of one (1) year after the date of the final certificate for payment. At the end of that time, payment will be made to the Contractor. The City may accept a One (1) Year Maintenance Bond in lieu of the 5% retainage, at the discretion of the Engineer.
- d. The Contractor shall protect and save the City of Long Beach harmless against any liability arising from personal injuries or property damage which may result from the performance from this contract and policies of insurance against such liability in form satisfactory to the City, whereby the City appears as named insured, shall be provided to the City prior to the commencement of work in the amounts as stated in the Conditions of Contract.
- e. The Contractor shall maintain Workmen's Compensation Insurance for all employees and subcontractors and certificates of such insurance shall be provided to the City, which certificates shall set forth the fact notices shall be given to the City in case of cancellation. This contract shall be void unless the Contractor is in compliance with Workmen's Compensation Law

(GML Sec. 108)



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FORM OF CONTRACT (Cont.)

- f. This Contract is hereby awarded to the Contractor for the work and materials called for under his bid in the proposal section of these Contract documents as shown on the Contract plans prepared by: **AI-ALT Design Engineering Consultants**

Designated as Items:

RESOLUTION NO: 03/25 OF 1/1/25

TOTAL BID AMOUNT: \$484,100.00



City of Long Beach

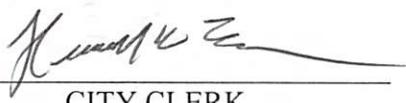
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FORM OF CONTRACT (Cont.)

IN WITNESS WHEREOF, the City of Long Beach, as represented by the City Council, has caused this agreement to be signed by the City Manager, pursuant to a resolution of authorization by the City Council, bearing date of 7 day of January, 2025 and the Contractor has hereunto set his hand seal, the day and year first above written, bearing Resolution No. 03/25.

CITY OF LONG BEACH
NASSAU COUNTY, NEWYORK

BY: 
CITY MANAGER
CITY OF LONG BEACH, NASSAU COUNTY, N. Y.


CITY CLERK

AFL General Contracting, Inc.
CONTRACTOR

SIGNED BY: 
TITLE: Gianni J. Mario President



WITNESS: _____

WITNESS: _____

1890. 10. 20.

1890. 10. 20.

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1890. 10. 20.

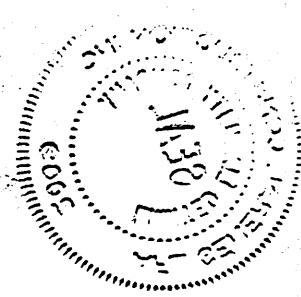
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City of Long Beach

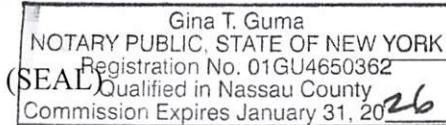
NEW YORK 11561

FORM OF CONTRACT (Cont.)

(ACKNOWLEDGEMENT OF OFFICER OF THE CITY EXECUTIVE CONTRACT)

STATE OF NEW YORK)
COUNTY OF NASSAU)
) SS:

On this 22 day of JAN, 2025, before me personally
came and appeared Daniel Creighton, to me known, who being by me duly
sworn, did depose and say that he is the City Manager of the CITY OF LONG
BEACH, described in and which executed the foregoing instrument; that by virtue of the
authority conferred on him by law, he subscribed his name to the foregoing instrument and that
he executed the same for the purposes therein mentioned.



Gina T. Guma
Notary Public

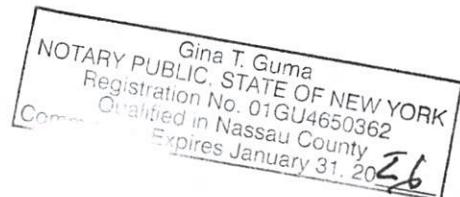
(ACKNOWLEDGEMENT OF OFFICER OF THE CITY ATTESTING CONTRACT)

STATE OF NEW YORK)
COUNTY OF NASSAU)
) SS:

On this 22 day of Jan 2025, before me personally came
and appeared David Fraser to me known, who being by me duly sworn, did
depose and say that he/she is the CITY CLERK of the CITY OF LONG BEACH described in
and which executed the foregoing instrument; that he/she knows the seal of the City of Long
Beach; that he/she is the official custodian of such seal; that one of the impressions appearing on
said instrument is a true and correct impression of such seal; and that he/she affixed it thereto
and attested the same over his/her signature by virtue of the authority in him/her vested.

(SEAL)

Gina T. Guma
Notary Public





City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

ACKNOWLEDGEMENT OF CONTRACTOR, IF A CORPORATION

STATE OF NEW YORK)

COUNTY OF NASSAU) SS:

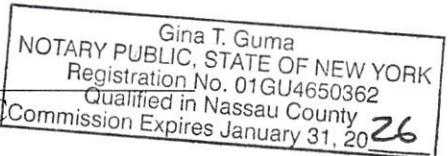
On this 21st day of January, 2025, before me personally came and appeared Gizem F. Marin, to me known, who being by me duly sworn, did depose and say that he/she resides at

492 Henry Blvd Holbrook NY 11731 that he/she is the President of the corporation described in and

which executed the foregoing instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was affixed by order of the Directors of said corporation, and that he/she signed his/her name by like order.

(SEAL)

Jenna Jenna
NOTARY PUBLIC



ACKNOWLEDGEMENT OF CONTRACTOR, IF A PARTNERSHIP

STATE OF NEW YORK)

) SS:

COUNTY OF NASSAU)

On this _____ day of _____, 2025, before me personally came and appeared _____, to me known and known to me to be one of the members of the firm _____

described in and who executed the foregoing instrument, and he duly acknowledged to me that he/she executed the same as and for the act and deed of said firm.

(SEAL)

NOTARY PUBLIC



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

ACKNOWLEDGEMENT OF CONTRACTOR, IF AN INDIVIDUAL

STATE OF NEW YORK)

COUNTY OF NASSAU)

On this _____ day of _____, 2024 before me personally came and appeared _____, to me known and known to me to be the person described in and who executed the foregoing instrument, and acknowledged that he/she executed the same.

(SEAL)

NOTARY PUBLIC



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

AFFIDAVIT

WORKMAN'S COMPENSATION POLICY

STATE OF NEW YORK)

) SS:

COUNTY OF NASSAU)

of _____,

being duly sworn, deposes and says that he/she has applied for a Workman's Compensation Policy to cover the operations as set forth in the preceding contract, and to comply with the provisions thereof.

CONTRACTOR

SUSCRIBED AND SWORN TO BEFORE

ME THIS ____ DAY OF _____, 20____

NOTARY PUBLIC

AFFIDAVIT

PROPERTY DAMAGE AND PUBLIC LIABILITY

STATE OF NEW YORK)

) SS:

COUNTY OF NASSAU)

of _____,

being duly sworn, deposes and says that he/she has applied for all policies of Public Liability and Property Damage Insurance required by SECTION 11 of the Conditions of Contract.

CONTRACTOR

SUSCRIBED AND SWORN TO BEFORE

ME THIS ____ DAY OF _____, 20____

NOTARY PUBLIC



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

PERFORMANCE BOND SAMPLE (With Labor and Materialmen Clauses)

KNOW ALL MEN BY THESE PRESENT, that we _____

_____, of _____

_____ (hereinafter called the "Principal") and the _____

_____, a corporation created and existing under the

laws of the State of _____, and having its principal

office in the City of _____, (hereinafter called the

"Surety"), are held and firmly bound unto _____

_____ (hereinafter called the "Obligee"), in the penal sum of

_____ Dollars (\$ _____), lawful money of the United

States of America, for payment of which, well and truly to be made, the said principal bind(s)

themselves (himself, itself) and their (his, its) heirs, executors and administrators, successors and

assignees, all jointly and severally, firmly by these present.

Signed, sealed and dated this _____ day of _____, 20 ____.

WHEREAS, said Principal has entered into certain written contract with said Obligee,

dated as of the _____ day of _____, 20 ____, (hereinafter called the

"Contract") for _____, a copy of which contract is hereto annexed and

hereby made part of this bond as if herein set forth in full.



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

NOW, THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE SUCH THAT, if the said Principal, their (his, its) heirs, executors and administrators, successors or assignees or any or either of them shall,

1. Well and truly and in good, sufficient and workmanlike manner, perform or cause to be performed said contract, and any amendment or extension of or addition thereto, and each and every of the covenants, promises, agreements and provisions therein stipulated and contained to be performed by said Principal, and complete the same within the period therein mentioned; and in each and every respect comply with the conditions therein mentioned to be complied with by said Principal, and fully indemnify and save harmless the said Obligee from all costs and damages which it may suffer by reason of failure to do so and fully reimburse and repay the said Obligee all outlay and expense which it may incur in making good any such default, and
2. Also pay or cause to be paid the wages and compensation for labor performed, and services rendered to all persons engaged in the prosecution of the work provided for therein, whether such persons be agents, servants or employees of the said Principal, their (his, its) heirs, executors and administrators, successors or assignees, or by any subcontractor or of any assignee thereof, including all persons so engaged who perform work of laborers or of mechanics regardless of any contractual relationship between the said Principal, their (his, its) heirs, executors and administrators, successors or assignees, or by any subcontractor or of any assignee thereof, and such laborers or mechanics but not including office employees not regularly stationed at the site of the work, and further, shall pay or cause to be paid, all lawful claims of subcontractors and of material men and other third persons arising out of or in connection with said contract and the work, labor, services, supplies and material furnished in and about the performance and completion thereof, then these obligations shall be null and void; otherwise they shall remain in full force and effect.



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

PROVIDED, however, that this bond is subject to the following additional conditions and limitations:

All persons who have performed labor or rendered services as aforesaid, all subcontractors, and all persons, firms, corporations, including materialmen and third persons, as aforesaid, furnishing work, labor, services, supplies and materials under or in connection with said contract, or in or about the performance and completion thereof, shall have a direct right of action (subject to the prior right of the Obligee) under any claim against the surety and its successors and assignees on this bond which right of actions shall be asserted in proceedings instituted in the State in which work, labor, services, supplies or material were performed, rendered or furnished, or where work, labor, services, supplies are in more than one State than in any other State.

Insofar as permitted by the laws of such State, said right of action shall be asserted in a proceeding instituted in the name of the said Obligee to the use and benefit of the person, firm, or corporation instituting such action and of all other persons, firms, and corporations having a claim hereunder, and any other persons, firms or corporations having claims hereunder shall have the right to be made a party to such proceedings, (but not later than six (6) months after the performance of said contract and final settlement thereof) and to have such claim adjudicated in such action and judgment rendered thereon prior to the institution of such a proceeding by a person, firm or corporation in the name of such a said Obligee, as aforesaid. Such person, firm or corporation shall furnish the said Obligee with a bond or indemnity for costs, which bond shall be in the amount satisfactory to the said Obligee.

- (b) The said Surety or its successors or assignees shall not be liable hereunder for any damages or compensation recoverable under any Workmen's Compensation or Employee's Liability Statute.
- (c) In no event shall the said Surety, or its successors, or assignees, be liable for a greater sum than the penalty of this bond, exclusive of the proper progress payments made pursuant to this contract as the work is progressed, or subject to any suit, action or proceeding hereon that is instituted by any person, firm or corporation under the provisions of the above section (a) later than six (6) months after the complete performance of said contract and final settlement thereof.



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

The said Principal, for themselves (himself, itself) and their (his, its) heirs, executors and administrators, successors and assignees, and the said surety, for itself and its successors and assignees do hereby expressly waive any objection that might be interposed as to the right of said Obligee to require a bond containing the foregoing provision, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought herein by any person, firm or corporation, including subcontractors, material, men and third persons, or work, labor, services, supplies, or material performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the said Obligee to require the foregoing provision to be placed in this bond.

And the said Surety, for value received, for itself and its successors and assignees hereby stipulates and agrees that the obligations of said Surety and of its successors and assignees and this bond, shall in no way be impaired or affected by any extension of time, modification, omission, addition or change in or to the said contract or the work to be performed there under or by any payment there under before the time required therein, or by any waiver of any provision thereof, or by an assignment, subletting or other transfer of any monies due or to become due there under; and the said Surety, for itself and its successors and assignees, does hereby waive notice of any and all of such extensions, waivers, assignments, subcontractors, and transfers, and omitted to be done by and in relation to (executors, administrators) successors, assignees, subcontractors and other transferees shall have the same effect as to said Surety and its successors and assignees as though done or omitted to be done by and in relation to said Principal.



City of Long Beach

NEW YORK 11561

FORM OF CONTRACT (Cont.)

WITNESS our hands and seals this _____ day of _____, 20____

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

ATTEST:

_____ COMPANY

TITLE

BY

ATTEST:

SURETY



City of Long Beach

NEW YORK 11561

If the Contractor (Principal) is a partnership, the bond shall be signed by each of the individuals who are partners.

If the Contractor (Principal) is a Corporation, the bond shall be signed in its correct corporation name by a duly authorized officer, agent or attorney-in-fact.

There shall be executed an appropriate number of counterparts of the bond corresponding to the number of counter parts of the contract.

Each executed bond should be accompanied by:

- (a) Appropriate acknowledgments of the respective parties.
- (b) Appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety.
- (c) A duly certified extract from By-Laws or Resolution of Surety under which Power of Attorney or other certificate of Authority of its agents, officers or representatives was issued, and
- (d) Duly certified copy of latest published financial statement of assets and liabilities of Surety.

ACKNOWLEDGEMENT OF SURETY

STATE OF NEW YORK)

) SS:

COUNTY OF)

On this _____ day of _____, 2024, before me personally came and appeared _____, to me known, who, being by me duly sworn, did depose and say that he resides at _____ that he is the _____ the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that it was so affixed by order of the Directors of said corporation and that he signed his name thereto by like order.

(SEAL)

NOTARY PUBLIC



City of Long Beach

NEW YORK 11561

CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS

1. GENERAL PROVISIONS

The following including the provisions concerning maximum hours of work, minimum rates of pay, and overtime compensation, with respect to the categories and classifications of employees hereinafter mentioned are included in this Contract pursuant to the requirements of applicable State or Local Laws, but the inclusion of such provisions shall not be construed to relieve the Contractor or any subcontractor from the pertinent requirements of any Federal Labor-Standards Provisions of this Contract. In case the minimum rates of pay set fourth in Par 3 hereof shall be higher than the minimum rates of pay required by or set fourth in the Federal Labor-Standard Provisions for this Contract for corresponding classifications, the minimum rates of pay set fourth in Par 3 hereof shall be deemed, for the purposes of this Contract, to be applicable minimum rates of pay for such classifications. The limitations, if any, in these New York State Labor-Standard Provisions upon the hours per day, per week or per month which employees engaged on the work covered by this Contract may be required or permitted to work thereon shall not be exceeded.

2. COMPLIANCE WITH LABOR AND PENAL LAWS

The contractor hereby expressly agrees to comply with all the provisions of the Labor Law and any and all amendments thereto, insofar as the same are applicable to this contract. The Labor Law, as amended, provides that no laborer, workman or mechanic in the employ of the Contractor or other person doing or contracting to do the whole or a part of the work contemplated by this contract shall be permitted or required to work more than eight (8) hours in any day or more than five (5) days in any week, except in an emergency: that the wages to be paid for a legal days work as hereinafter defined to laborers, workmen or mechanics upon the work called for under this contract or for any materials used upon or in connection therewith shall not be less than the prevailing rate for a day's work in the same trade or occupation in the locality within the State where such work is to be done and each laborer, workmen or mechanic employed by the Contractor, subcontractor or other person about upon the work shall be paid the wages herein provided; that employees engaged in the construction, maintenance and repair of highways and in water works construction outside the limits of the cities and villages are no longer exempt from the provisions of the Labor Law which require the payment of the prevailing rate of wages and the eight (8) hour day.



City of Long Beach

NEW YORK 11561

CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

Section 222 of the Labor Law, as amended by Chapters 556 and 557 of the Laws of 1933, provides that preference in employment shall be given to citizens of the State of New York who have been residents for at least six (6) consecutive months immediately prior to the commencement of their employment. Each person so employed shall furnish satisfactory proof of their residence, in accordance with the rules adopted by the Industrial Commissioner. Persons other than citizens of the State of New York shall be employed only when such citizens are not available. Section 222 further provides that upon the demand of the State Industrial Commissioner, the Contractor shall furnish a list of names and addresses of all his subcontractors, and further provides that a violation of this section shall constitute a misdemeanor and shall be punishable by a fine of not less than Fifty Dollars (\$50.00) nor more than Five Hundred Dollars (\$500.00) or by imprisonment for not less than thirty (30) nor more than ninety (90) days, or both fine and imprisonment.

Section 220-A of the Labor Law, as amended by Chapter 472 of the Laws of 1932, provides that before payment is made by or on behalf of the State or any City, County, Town or Village or other civil division of the State, of any sums due on account of a contract for a public improvement, it is the duty of the comptroller or the financial officer of the Municipal Corporation to require the contractor and each and every subcontractor to file a certified statement in writing, in satisfactory form, certifying to the amounts then due and owing to any and all laborers for daily or weekly wages on account of labor performed upon the work of the contract, setting forth therein the names of the persons whose wages are unpaid and the amount due each respectively.

Section 220-B of the Labor Law, as so amended, provides that any interested person who shall have previously filed a protest in writing objecting to the payment to any Contractor or subcontractor to the extent of the amount or amounts due or to become due to him for daily or weekly wages for labor performed on the public improvement for which the Contract was entered into, or if, for any other reason, it may be deemed advisable, the Comptroller of the State or other financial officer of the Municipal Corporation may deduct from the whole amount any payment on account thereof the sum or sums admitted by any Contractor or subcontractor in such statement or statements so filed to be due and owing by him on account of labor performed and may withhold the amount so deducted for the benefit of the laborers for daily or weekly wages, whose wages are unpaid as shown by the verified statements filed by any contractor or subcontractor and may pay directly to any person the amount or amounts so shown to be due for such wages.

Section 220-C of Labor Law as so amended, provides the penalty for making of a false oath or verification



City of Long Beach

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CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

Section 1918 of the Penal Law, as amended, provides that no person shall discharge explosives in the ground, nor shall any person other than a state or county employee regularly engaged in the maintenance and repair thereof excavate in any other existing street, highway or public place, unless notice thereof in writing shall have been given at least seventy-two hours in advance of the person, corporation or municipality engaged in the distribution of gas in such territory. The person having direction or control of such work shall give such notice and further he shall ascertain whether there is within one hundred feet in such street, highway or public place, or in the case of a proposed discharge of explosives within a radius of two hundred feet of such discharge, any pipe of any person, corporation or municipality conveying combustible gas, or if there be any such pipe he shall also give such notice to any such person, corporation or municipality. Provided, however, that in any emergency involving danger to life, health or property it shall be lawful to excavate without using explosives if the notices prescribed herein are given as soon as reasonably possible and to discharge explosives to protect a person or persons from an immediate and substantial danger of death or serious personal injury if such notices are given before any such discharge is undertaken. Any such work shall be performed in such manner to avoid damage to any pipe conveying combustible gas. Any violation of the provisions of this section shall be a misdemeanor.

Section 220-D of the Labor Law provides that the advertised specifications for every Contract for the construction, reconstruction, maintenance and/or repair of highways, to which the State, County, Town, and/or City is a party shall contain a provision stating the minimum rate of hourly wage that can be paid, as shall be designated by the Industrial Commissioner, to the laborers employed in the performance of the Contract, either by the contractor, subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the Contract, and the Contract shall contain a stipulation that such laborers shall be paid not less than such hourly minimum rate of wage. Any person or corporation that willfully pays after entering into such Contract, less than such stipulated minimum hourly wage scale, shall be guilty of a misdemeanor and upon conviction, shall be punished for a first offense by a fine of Five Hundred Dollars (\$500.00) or by imprisonment for not more than thirty days (30) or by both fine and imprisonment for a second offense by a fine of One Thousand Dollars (\$1,000.00) and, in addition thereto, the Contract on which the violation has occurred shall be forfeited; and no such person or corporation shall be entitled to receive any sum nor shall any officer, agent, or employee of the State pay the same or authorize its payment from the funds under his charge or control to any person or corporation for work done under any contract on which the Contractor has been convicted of second offense in violation of the provision of this section.



City of Long Beach

NEW YORK 11561

CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

Section 220-H of the Labor Law-OSHA Safety Course (contracts over \$250,000)

"All workers must complete a ten (10) hour or more OSHA-approved construction safety and health course".



City of Long Beach

NEW YORK 11561

MWBE REQUIREMENTS

I. General Provisions

The City of Long Beach is establishing participation goals for Minority and Women-owned Business Enterprises for use when procuring construction/maintenance repair services. It is the City's desire to promote equality of economic [opportunities for minority group members and women and the facilitation of Minority and Women-owned Business Enterprise participation. A Minority and Women-owned Business Enterprise (MWBE) is a business that is owned, operated and controlled specifically by a composition of minimally 51% minority members and/or women that has been certified as a Minority and/or Women-owned Business Enterprise by the New York State Empire State Development's (ESD) Division of Minority and Women Business Development (DMWBD)

Construction/maintenance/repair contract valued at \$250,000 or more will require good faith efforts to meet MWBE participation goals and must include the MWBE goals in the awarding document (contract).

The contractor must document "good faith efforts" to provide meaningful participation by MWBEs in the performance of this Contract. The Contractor acknowledges that if Contractor is found to willfully and intentionally failed to comply with the MWBE participation goals set forth in the Contract, such a finding constitutes a breach of Contract and the Contractor shall be liable to the Corporation for liquidated or other appropriate damages, as set forth herein.

II. Contract Goals

- A. For purposes of this contract, the City hereby establishes an overall cumulative goal of 30% for Minority and Women-owned Business Enterprises ("MWBE") participation.
- B. For purposes of providing meaningful participation by MWBEs on this Contract and achieving the Contract Goals established herein. The Contractor should reference the directory of New York State Certified MWBEs found at the following internet address:
<https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp>

Additionally, the contractor is encouraged to contact the Division of Minority and Women Business Development (518) 292-5250; (2122) 803-2414; or (716) 846-8200 to discuss additional methods of maximizing participation by MWBEs on this contract.

- C. Reporting requirements are necessary for each contract. The Designate Minority and Women-Owned Business Enterprise Officer is responsible for ensuring that the Contractor submit the following forms:
 - M/WBE Utilization Plan-submit with Bid
 - EEO Statement
 - M/WBE and EEO Policy Statement
 - M/WBE Quarterly Report
 - EEO Staffing Plan
 - Affirmation of Payment to MBE/WBE
 - Contract and Subcontract Activity



City of Long Beach

NEW YORK 11561

3. **MINIMUM HOURLY RATE OF WAGE**

The minimum rate of wage which shall be paid for laborers, workingmen or mechanics employed in the performance of this Contract, as designated by the Industrial Commissioner of the State of New York are set forth as follows:

CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS

- THE HIGHER OF THE FOLLOWING WAGE RATE SCHEDULES SHALL BE UTILIZED :
 NEW YORK STATE PREVAILING WAGE RATES
 DAVIS-BACON FEDERAL WAGE RATES
- CERTIFIED PAYROLL MUST INCLUDE A COPY OF THE NYS PREVAILING WAGE RATES FROM THE DEPARTMENT OF LABOR WEBSITE
- M/WBE DIVERSITY FORMS MUST BE SUBMITTED WITH ALL REQUESTS FOR PAYMENT



City of Long Beach

NEW YORK 11561

CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

4. Maximum Hours of Labor

No laborer, workman or mechanic, employed to do work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day or more than five (5) days in any one week except in case of extraordinary emergency caused by fire, flood, or danger to life or property.

5. Preference In Employment The contractor agrees to give preference in employment to laborers, workmen, and mechanics to resident citizens in accordance with Section 220 & 222 of the New York State Labor Law, as amended, as applicable to this Contract. Other citizens may be employed as laborers, workmen and mechanics, when the contractor has established to the satisfaction of the City that said resident citizens are not available for employment. If Section 222 of New York State Labor Law, as amended, is not complied with, this Contract Shall be void.

Effective August 9, 1975, preference in employment upon any public work project involving the expenditure of public funds shall be given to citizens who have been residents of New York State for TWELVE (not six) consecutive months, immediately prior to the commencement of their new employment.

Whenever the unemployment rate in a Standard Metropolitan Statistical Area (SMSA) in New York State is determined by the Federal Bureau of Labor Statistics to be six per cent or more for three consecutive months, preference in employment on public work projects in that SMSA shall be given to citizens of New York State who have been residents of that SMSA for twelve consecutive months prior to the commencement of their employment. This preference will continue until the unemployment rate for that SMSA is below six per cent for three consecutive months. The Bureau of Public Work will notify all departments of jurisdiction to whom this preference applies. The departments of jurisdiction must in turn inform all their Contractors and sub-contractors that this condition must be complied with as part of the Contract for the work.

Each citizen employed upon public work projects shall furnish satisfactory proof of qualification in his trade or skill to the Contractor. Forms for this purpose should be obtained by Contractors from the Albany office of the Bureau of Public Work.



City of Long Beach

NEW YORK 11561

Each Contractor performing public work must furnish a list of the names and addresses of all his subcontractors to the Albany office of the Bureau of Public Work. Each Contractor or subcontractor performing public work must submit in the appropriate district office a list of his employees, stating whether they are citizens of New York State; if naturalized citizens of the United States; if naturalized, the date thereof; and the name of the court in which citizenship was granted.

6 Payment In Cash

Each laborer, workman or mechanic employed by the Contractor, subcontractor or other person about or upon the work under this Contract shall be paid in cash as provided by Section 220 of the New York State Labor Law, as amended.

7. New York State Labor Law

The Contractor and each and every subcontractor performing work on this project to which this Contract relates shall comply with the applicable provisions of the New York State Labor Law, as amended.

The Bidder is specifically advised as to labor provisions of the Contract to include but not be limited to Compliance with:

- a. Minimum State Wage Rates
- b. State Labor Standards

Every Contractor and Sub-Contractor shall submit to the Department of Public Works within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

8. State of New York, Non- Discrimination Clauses

During the performance of this Contract the Contractor agrees as follows:

- a. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, color or national origin. Such action shall be taken with reference, but not limited to recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining , including apprenticeship and on-the-job training.



City of Long Beach

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CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

- b. The Contractor will send to each labor union or representatives of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the New York State Commission for Human Rights, advising such labor union or representative of the Contractor agreement under clauses a. through h. of this paragraph (hereinafter called "non-discrimination clauses"). If the Contractor was directed to do so by the City as part of the bid or negotiation of this Contract, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color or national origin, and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under this Contract shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such union or representative fails or refuses to comply with such a request, that it furnish such a statement, the Contractor shall promptly notify the New York State Commission for Human Rights of such failure or refusal.
- c. The Contractor will post and keep posted in conspicuous places, available employees and applicants for employment, notices to be provided by the New York State Commission for Human Rights setting forth the substance of the provisions of clauses a. and b. of this paragraph and such provisions of the States laws against discrimination as the New York State Commission for Human Rights shall determine.
- d. The Contractor will state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.



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CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

- e. The Contractor will comply with the provisions of sections 291-199 of the Executive Law and Civil Rights Law of the State of New York, will furnish all information and reports deemed necessary by the New York State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the New York State Commission for Human Right, the Attorney General, the City , Commissioner of Housing and Community Renewal and the Industrial Commissioner of the State of New York for purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.
- f. This Contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the City upon the basis of a finding made by the New York State Commission for Human Rights that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future contracts made by or on behalf of the State of New York or a public authority or agency of the State or housing authority or an urban renewal agency, or contracts requiring the approval of the New York State Commissioner of Housing and Community Renewal, until he has satisfied the New York State Commission for Human Rights that he has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses.

Such finding shall be made by the New York State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified compliant has been filed with the Commission, notice thereof has been given to the Contractor and an opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.

- g. If this Contract is cancelled or terminated under clause f., in addition to other rights of the City provided in this Contract upon its breach by the Contractor, the Contractor will hold the City harmless against any additional expenses or costs incurred by the City in completing work in purchasing the services, materials, equipment or supplies contemplated by the Contract and the City may withhold payments from the Contractor in an amount sufficient for this purpose and recourse may be had against the surety on the performance bond if necessary.



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CONDITIONS OF CONTRACT - NEW YORK LABOR STANDARDS PROVISIONS (Cont.)

- h. The Contractor will include the provisions of clauses a. through g. of this paragraph, in every subcontract or purchase order altered only to reflect the proper identity of the parties in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontract or purchase order as the City may direct, involving sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the City, the Contractor shall promptly so notify the said Attorney General, requesting him to intervene and protect the interests of the State of New York. The Contractor shall send a copy of such notification to the said Attorney General to the City for such action as it may deem proper.

9. Lien Law

The provisions of the Lien Law, as amended, of the State of New York in relation to funds being received by a contractor for a public improvement declared to constitute trust funds in the hands of such Contractor to be applied first to the payment of certain claims, is made applicable to this Contract.

10. Foreign Contractors

Foreign Contractors must comply with the provisions of Article 9A and 16 of New York State Tax Law, as amended, prior to submission of proposal for the performance of the work. The certificate of the New York State Tax Commission to the effect that all taxes have been paid by the foreign Contractor shall be conclusive proof of the payment of taxes. The term "foreign contractor" as used in this subdivision means in the case of an individual, a person who is legal resident of another state or foreign country; in the case of a firm or co-partnership, one having one or more partners who is a legal resident of another state or foreign country; and in the case of a foreign corporation, one organized under the laws of a State other than the State of New York.



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CONDITIONS OF CONTRACT – NEW YORK LABOR STANDARDS PROVISIONS (cont)

11.

Refusal to Waive Immunity - Pursuant to the Provisions of Section 103 A of the General Municipal Law, of the State of New York in the event that the Bidder, or any member, partner, director or officer of the Bidder, should refuse, when called before a grand jury to testify concerning any transaction or contract had with the State of New York, any political subdivision thereof, a public authority or with any public department, agency or official of the State of New York or of any political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract, such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contract with any municipal corporation or any public department, agency or official thereof, for goods, work or services, for a period of five (5) years after such refusal, and any and all contracts made with any municipal corporation or any public department, agency or official thereof since the effective date of this law, by such person, and by any firm, partnership or corporation of which he is a member, partner, director or officer may be cancelled or terminated by the municipal corporation without incurring any penalty or damages on account of such cancellation or termination, but any monies owing by the municipal corporation for goods delivered or work done prior to the cancellation or termination shall be paid.

12. Applicability of All Laws

Each and every provision of any law and clause required by law to be inserted in and applicable to this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein.



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GENERAL SPECIFICATIONS - GENERAL CONSTRUCTION

1. Scope

The work under this Contract includes furnishing all materials, equipment, labor, etc.

2. General Specifications

- a. The "General Specifications" of the contract are hereby made a part of this contract specifications and are attached herein.
- b. Where any article of the "General Specifications" is supplemented hereby, the provision of such article shall remain in effect. All the supplemental provisions shall be considered as added thereto. Where any such article is amended, voided or superseded thereby, the provisions of such article not so specifically amended, voided or superseded shall remain in effect.

3. Standard Specifications

Where reference is made in these specifications to the Specifications of the American Society of Testing Materials, (A.S.T.M); the American Water Works Association, (A.W.W.A.); ACI American Concrete Institute; AISC American Institute of Steel Construction; the National Electrical Manufacturer's Association, (N.E.M.A.), or other societies, the portion referred to shall be read into and shall be a part of this contract and specifications. Materials, methods and equipment shall conform with the latest A.S.T.M., N.E.M.A. etc. specifications as they may relate to or govern the construction work.

4. No Direct Payment

No separate direct payment may be made for work done and for materials furnished under these General Specifications or the General Conditions of the contract, but compensation shall be deemed to have been included in the total contract price of the entire work.

5. Workmanship

It is the intent of these Specifications to describe definitely and fully the character of materials and workmanship required with regard to all ordinary features, and to require first-class work and materials in all particulars.

For any unexpected features arising during the progress of the work and not fully covered herein; the specifications shall be interpreted by the Engineer to require first-class work and materials, and such interpretation shall be accepted by the Contractor.



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GENERAL SPECIFICATIONS - GENERAL CONSTRUCTION (Cont.)

6. Proper Method of Work And Proper Materials

The Engineer shall have the power in general to direct the order and sequence of the work, which be such as to permit the entire work under this Contract to begin and to proceed as rapidly as possible, and such as to bring the several parts of the work to a successful completion at about the same time.

If any time before the commencement of or during the progress of the work the materials and appliances used or to be used appear to the Engineer as insufficient or improper for assuring the quality of work required, or the required rate of progress, he may order the Contractor to increase their efficiency or to improve their character, and the failure of the Engineer to demand any increase of such efficiency or improvement shall not release the Contractor from his obligation to secure the quality of work or the rate of progress specified.

During freezing or inclement weather, no work shall be done except such as can be done satisfactorily and in a manner to secure first-class construction throughout. All work shall be done in such a manner as will properly protect and support existing permanent structures, pipe lines, etc.

7. Inspection

The Contractor shall, at all times, provide convenience of access and safe and proper facilities for the inspection of all parts of the work. No work, except such shop work as may be so permitted, shall be done except in the presence of the Engineer or his assistants.

The Contractor shall notify the Engineer twenty-four (24) hours in advance as to when he intends to start or resume the work.

No materials of any kind shall be used upon the work until it has been inspected and accepted by the Engineer; all materials rejected shall be immediately removed from the work and not again offered for inspection.

Any materials or workmanship found at any time to be defective shall be remedied at once, regardless of previous inspection. The inspection and supervision of the work by the Engineer is intended to aid the Contractor in applying labor and materials to and in accordance with the specifications, but such inspection shall not operate to release the Contractor from any of his Contract obligations.



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GENERAL SPECIFICATIONS - GENERAL CONSTRUCTION (Cont.)

8. Preconstruction Conferences On Equal Employment Opportunity Obligations, Etc.(N.I.C.)

9. Job Meetings

- a. Job meetings will be scheduled periodically by the Engineer during the course of construction. Present at these meetings shall be duly authorized representatives of all Contractors and such of their subcontractors as are requested by the Engineer.
- b. The purpose of the meetings is to coordinate the efforts all concerned so that the project will progress to "on time" completion in the most reasonable manner. To this end, the Contractors and subcontractors will be prepared to answer questions at the job meetings on pertinent matters such as progress, workmanship, coordination and any other subject on which the Engineer may reasonably require information.
- c. The Engineer may prepare and distribute to all concerned the official minutes of all job meetings.

10. Progress Schedules

- a. The General Contractor shall:
 - i. Provide a progress schedule in the form of a bar graph.
 - ii. The General Contractor shall be the first to prepare the progress schedule and distribute 2 prints to each Contractor. Subsequently, each Contractor shall submit two (2) copies of his proposed progress schedule to each of the other Contractors who shall return one (1) copy with their comments until all Contractors are in agreement with all of the finally corrected proposed progress schedules of each.
 - iii. Each Contractor shall then submit for approval two (2) prints of his finally corrected and agreed upon proposed schedule to the Engineer and shall revise same, until approved by the Engineer.
 - iv. Each Contractor shall then submit his up-to-date progress schedule before the 3rd day of each month.



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GENERAL SPECIFICATIONS - GENERAL CONSTRUCTION (Cont.)

11. Permits And Regulations

The Contractor shall obtain and pay for all permits necessary to conduct the work and complete this contract. All work shall be performed in strict accordance with the regulations and requirements of the various civil agencies having jurisdiction thereof. Upon completion of work provided for in this Contract, and before final payment shall be made, the Contractor shall furnish the engineer with any necessary certificates of approval issued by these various agencies.

12. Occupational Safety And Health Act

The Contractor shall meet all standards of the Occupational Safety and Health Act of 1970. This shall include but not be limited to the following areas: Sanitation, noise, radiation, gases, vapors, fumes, mists, dust, illumination, ventilation, protective equipment, fire protection, waste disposal, electrical hazards, floor holes and wall openings, and heavy equipment. All scaffolds and ladders utilized on the contract shall be designed by a registered professional engineer. All specific requirements of the Act shall be adhered to.

13. Labor

- a. All Contractors and subcontractors employed upon the work shall and will be required to conform to the Labor Laws of the United States and of the State of New York and the various acts amendatory and supplementary thereto; and to all other laws, ordinances and legal requirements applicable thereto.
- b. All labor shall be performed in the best and most workmanlike manner by mechanics skilled in their respective trades. The standards of the work required throughout shall be of such grade as will bring results of the first class only.
- c. The Contractor shall provide his own temporary light and power and water supply until a temporary electric service is established (on projects where an electrical contract is to be let). In the event that no electrical contract is let the General Contractor will be responsible for his own power and light for the entire duration of the project. The Contractor shall pay for all current for temporary power and lighting. The City will not charge for water used.

14. Sanitary Regulations

Necessary sanitary conveniences for the use of the laborers on the work, properly secluded from observation, shall be erected and maintained by the Contractor in such manner and at such points as shall be approved, and their use shall be strictly enforced. The contents of the same shall be removed, with sufficient frequency to prevent nuisance,



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and disposed of to the satisfaction of the Engineer. The Contractor shall obey and enforce such other sanitary regulations and orders, and shall take such precautions against infectious diseases as may be deemed necessary. In case any infectious diseases occur among his employees, he shall arrange for the immediate removal of the patient from the work and his isolation from all persons connected with the work. The building of shanties or other structures for housing the men, tools, machinery or supplies will be permitted only at approved places, and the sanitary condition of the grounds in and at such shanties or other structures must, at all times, be maintained in a satisfactory manner.

15.Temporary Sheds (For Storage)

The General Contractor shall provide and maintain on the premises where directed, watertight storage sheds for storage of all materials which might be damaged by weather and shall remove them from the site at the completion of the work.

16.Notifying Other Utility Companies

The Utility Companies shall be notified in accordance with Article 20, Section 322-a of New York State General Business Law, entitled, "Construction or Blasting Near Pipes Conveying Combustible Gas", which states, "the person having direction or control of such works shall give such notice and further, he shall ascertain whether there is within one hundred feet in such street, highway or public place any pipe conveying combustible gas."

17.Public Utility Interference

All conduits, sewers, storm drains, water mains, underground electric and telephone conductors or conduits, or gas mains encountered in the construction shall be properly and safely taken care of by the Contractor, who shall, upon encountering same, notify the public corporation to whom they belong, in order that they may be changed in such a manner as not to interfere with the final construction.

18.Injury To Service Pipes

In case any damage shall result to any service pipe for water or gas, or any private or public sewer or conduit, the Contractor shall, without delay, and at his own expense, repair the same to the satisfaction of the Engineer and in case such repairs are not made promptly or satisfactorily, the City may have the repairs made by another contractor, or otherwise, and deduct the cost of same from any monies due to or become due the Contractor.



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19. Cooperation

The Contractor and all subcontractors shall coordinate their work with all adjacent work and shall coordinate with all other trades so as to facilitate the general progress of work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and for the storage of their materials.

20. Protection of Work

The Contractor shall place a sufficiency of red lights on or near any work accessible to the public and keep them burning sunset to sunrise; he shall erect suitable railings or barriers, and shall provide watchmen on the work by day or night, as required and deemed necessary for the safety of the work, on public or adjoining property.

The City reserves the right to remedy any neglect on the part of the Contractor as regards to the protection of the work which may come to its attention, after 24 hours notice in writing; except that in case of emergency, it shall have the right to remedy any neglect without notice, and in either case to deduct the cost of such remedy from money due the Contractor.

21. Representative Always Present

The Contractor, in case of his absence from the work, shall have a competent representative or foreman present, who shall follow without delay all instructions of the Engineer or his assistants in the prosecution and completion of the work, in conformity with this contract, and shall have full authority to supply labor and material immediately. The Contractor shall also have a competent representative available to receive telephone messages and provide a reasonable reply as soon as possible, but not later than twenty-four (24) hours.

22. Signs/Project Sign

No signs or advertisements will be allowed to be displayed unless a permit is obtained from the City Building Department and the sign is approved by the Engineer.

A. Sign Specifications

Installation

1. Install sign at the site within one week of the start of construction.
2. Erect sign in a prominent location, secure from vandalism.

Materials

1. Signboard: 5' x 8' x 7/8" (Min) Exterior plywood
2. Face 1/4" Tempered Masonite or equal. Frame 1-5/8 x 3-5/8 fir dressed four (4) sides
3. Assembly: 1-5/8 x 3-5/8" fir frame to fit 5'x8'x7/8" panel with two (2) center braces
4. Paint: Face- 3 coats outdoor enamel-white (sprayed)-rear and frames, stakes, brackets, etc.- 1 coat outdoor enamel (sprayed)
5. Lettering: Silk screen enamels where possible, or hand painted enamels



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6. Colors: White Background with Blue lettering

Maintenance and Removal

1. Maintain the sign plumb and level for the duration of the work.
2. The sign must be removed from the property 60 days after final payment or project completion, whichever is later.

B. Sign Design

See attachment for Sample Sign

C. Sign Placement

- I. On the front, back, adjacent to or around any traffic control device, including traffic signs, signals, changeable message signs, traffic control device posts or structures, or bridge piers.
- II. At key decision points where a driver's attention is more appropriately focused on traffic control devices, roadway geometry, or traffic conditions. These locations include, but are not limited to exit and entrance ramps, intersections controlled by traffic signals or by stop or yield signs, highway-rail grade crossings, and areas of limited sight distance.
- III. A project sign will be required to be furnished, installed and maintained by the Contractor at a location directed by the Engineer. The sign shall be a minimum of five (5) foot by eight (8) foot, painting and lettering shall be by a professional sign painter to the approval of the Engineer. Sign will be installed at a location near the beginning of the work. Installation may be required to be made on overhead traffic or light poles. The Contractor shall be responsible for maintaining the project sign during construction of the project.

23. Photographs

Prior to the commencement of any work to be performed under this contract, the Contractor shall inspect all structures, buildings, walls, curbs, and sidewalks along the route and/or in the vicinity of the work with the Engineer. Whenever cracks, breaks, defects, faults or structural decay is expected or visible, photographs shall be taken by a professional photographer identified to record each and every defect. Failure on the part of the Contractor to take such photographs will be construed as meaning that no defects existed prior to construction. Two (2) sets of photographs shall be furnished to the City.



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24. Shop Drawings

The Contractor shall submit promptly to the Engineer five (5) copies of each shop drawing prepared in accordance with the schedule predetermined as aforesaid. After examination of such drawings by the Engineer and the return thereof, the Contractor shall make such corrections to the drawings as have been indicated and shall furnish the Engineer with five (5) corrected copies. Regardless of corrections made in or approval given to such drawings by the Engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings and for their conformity to the contract drawings and contract specifications.

25. Additional Instruction and Detail Drawings

The Contractor will be furnished additional instructions and detail drawings as necessary to carry out the work included in the contract.

The additional drawings and instructions thus supplied to the Contractor will coordinate with the contract documents. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Engineer will prepare jointly (a) a schedule, fixing the dates at which special detail shop drawings, the beginning of manufacture testing and installation of materials, supplies and equipment, and the completion of the various parts of the work; each such schedule to be subject to change from time to time in accordance with the progress of the work.

26. As Built Drawings

The Contractor shall furnish, upon completion of all work, As Built Drawings showing the full extent of all facilities constructed. Contractor shall furnish three sets of As Built Drawings and one sepia reproducible of each sheet. Final payment may not be made until the City has reviewed and accepted such As Built Drawings.

27. Temporary Stairs, Ladders, Ramps, Runways, Hoists

The General Contractor shall furnish and maintain all equipment such as temporary stairs, ladders, ramps, scaffolds, hoists, runways, derricks, chutes, elevators, etc., as required for the proper execution of the work by all trades.

All such apparatus, equipment and construction shall meet all requirements of the Labor Law and other State or local laws applicable thereto.

28. Scaffolding

The General Contractor shall provide exterior scaffolding. All scaffolds shall be built in accordance with the requirements of all State and local laws and regulations



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29. Plans And Specifications To Be Furnished To The Contractor (NIC)

Each Contractor will be furnished three (3) complete sets of the plans and specifications. One complete set of plans and specifications shall be kept in the temporary office. Additional sets furnished to subcontractors will be supplied at the cost of reproduction.

30. Substitution of Equipment

After execution of a contract, substitution of equipment for that which is specifically named in the contract documents may be approved by the City Project Engineer only if it is sufficiently demonstrated that the specified equipment can not be delivered to the job in time to complete the proper sequence with the work of the other contractors AND the equipment proposed for substitution is equal and or superior to the equipment named in the specifications in construction, efficiency and utility.

Notice of a contractors inability to obtain specified equipment pursuant to the time sequence specified and a request for substitute equipment must be given in writing to the City's Project Engineer and accompanied by supporting descriptive and technical data. The Contractors failure to order equipment in sufficient time to obtain timely delivery WILL NOT be considered grounds for approval of a substitution.

All requests for substitution must be accompanied by descriptive and technical data, documentary proof, of the equality or difference in price and delivery, if any, in the form of certified quotations from suppliers for both specified and proposed equipment.

In case of a difference in price the City shall receive all benefit of the difference in the cost involved in substitution and the contract shall be altered by a change order - to credit the City with any savings so obtained.

The Contractor seeking to make the equipment substitution must demonstrate to the satisfaction of the City's Project Engineer that the inability to obtain the equipment specified to the job site in time to complete the work in the proper sequence is due to conditions beyond the control of the Contractor.



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The City's project engineer will be the sole judge of the efficiency and equality of any proposed substitution. The final determination by the City's Project Engineer shall be based on consideration of the proposed manufacturer's data sheets, plants, etc. submitted by the Contractor seeking the substitution and any other documents the Project Engineer shall require. The City, in its discretion, may request certification as to the adequacy, equality and functionality of the proposed substitute in performing comparable duties as the equipment specified. Such certification must be signed by a New York State licensed, Professional Engineer.

31. Materials, Services and Facilities

It is understood that, except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

32. Holidays

Any work necessary to be performed by employees after regular hours, on Sundays or Legal and/or City Holidays (as delineated below) shall first be approved by the Engineer and shall be performed without any expense to the City, with the Contractor responsible to reimburse the City for all costs of inspection, including, without limitation, the cost of employee base salary, overtime and all fringe benefits.

City Holidays:

New Year's Day	Yom Kippur	Columbus Day
Martin Luther King Day	Veteran's Day	Juneteenth
Presidents Day	Election Day	Thanksgiving Day
Good Friday	Memorial Day	Independence Day
Friday after Thanksgiving	Labor Day	Christmas Day



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33. Materials of Approved Equal

Where items or materials are specifically identified herein by a manufacturer's name, model or catalog number, only such specified items may be used in the contract documents, except as herein provided.

A contractor seeking to use materials other than those named in the contract documents, must apply in writing to the City's Project Engineer. Approval for changes in specifications after the bids have been opened may be granted in the discretion of the City's Project Engineer but only upon individual request of the actual bidding contractor. No blanket approval for substitution will be granted to suppliers, distributors or subcontractors.

Unless requests for changes in the base bid specifications are received and approved prior to the opening of bids pursuant to paragraph 6 of the Conditions of Contract each successful Contractor will be held to furnish the specified items under each contract bid. After the contract is awarded changes in specifications shall be considered pursuant to the terms and conditions of paragraph 34 or 37 of the General Specifications. All alternate material, proposals must be accompanied by full descriptive and technical data on the item proposed, together with a statement of amount either of addition to or deduction from the bid price if the alternate is accepted. The City's Project Engineer will be the sole judge of the efficiency and equality of any proposed material substitution. The City in its discretion may request certification as to the adequacy, equality and functionality of the proposed substitute in performing comparable duties as the material specified. Such certification must be signed by a New York State licensed, Professional Engineer.

In the case of a difference in price the City shall receive all of the benefit of the difference of the cost involved in any substitution and the contract altered by a written change order, crediting the City with any savings so obtained.

34. House of Operation

The Contractor will not be permitted to operate any tools or equipment used in construction, drilling, earthmoving, excavating or demolition work between the hours of 8:00 p.m and 8:00 a.m. on the following day and any time on Sundays or legal holidays (see Section 35 of General Specifications) except for emergency work or by special permission of the City.



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35. Nameplates and Device Plates

Where required, nameplates shall be phenolic type, 2-1/2"x3/4" with background and white engraved lettering.

Nameplates shall be securely affixed to each individual piece of equipment and/or switch, etc., by means of non-corrosive screws. Nameplates shall not be glued to equipment unless circumstances warrant such action and shall be done only if prior approval is obtained from the Engineer. Nameplates shall bear notations as shown on the Contract drawings for each piece of equipment or as otherwise directed by the Engineer. In either case, each Contractor shall submit a list of nameplates for review and approval by the Engineer.

36. Operator's Instruction Manuals

Each Contractor shall provide Operator's Instruction Manuals for all equipment furnished under each contract. Instructions shall be clearly printed and shall be bound under a hard cover. Each Contractor shall submit "Instructions" to the Engineer for approval prior to binding. Copies shall be given to the Engineer. In all, five (5) copies are required. Instructions shall be interpreted as catalog cuts and complete parts lists on equipment, maintenance procedures on equipment, complete wiring diagrams, etc.

37. Grades, Lines, Levels And Surveys

The Contractor will be responsible to provide a survey to determine exact distances for siting the facilities, preparing shop drawings, where required, at his own expense. All grades, lines, levels, bench marks and stakes shall be maintained by this Contractor who shall be responsible for same.

38. Boundaries of Work and Contiguous Work

The City will obtain from the property owners, rights-of-way for all work specified in this Contract, and the Contractor shall not enter or occupy with men, tools or materials, any private ground outside the easements and right-of-way without the consent of the Owner and the approval of the Engineer. Other Contractors of the City may, for all purposes required by their contract, enter upon the work and premises used by the Contractor, and the Contractor shall give to other Contractors of the City all reasonable facilities and assistance for the completion of adjoining work.



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39. Right-of-Way

Where the work called for extends upon or through private property, the City shall procure all necessary rights, deeds and easements for access to the property and the Contractor shall not proceed with this part of the work until the City has completed negotiations with the property holders and all necessary papers are in the hands of the City. If, after a reasonable period of negotiations, (up to one (1) year from signing of the contract), rights of easements cannot be obtained, then the City reserves the right to eliminate those items of work from the Contract which required the easements prior to construction. No additional compensation shall be made to the Contractor for such elimination.

40. Opening for Installation of Mechanical & Electrical Equipment

The General Contractor shall provide all necessary openings for installation of plumbing, heating and ventilation and electrical equipment within the proposed construction, except where shown otherwise on the CONTRACT DRAWINGS.

The plumbing, heating and ventilation and Electrical Contractors shall provide steel sleeves to the general Contractor for inclusion of these sleeves in the proposed construction by the general Contractor. The responsibility of exactness of size and location of these sleeves shall be on the respective Contractor. Wood for box openings shall be provided by the General Contractor.

All cutting and patching required to correct a faulty sleeve size or location shall be done by the General Contractor. All costs for such work shall be borne by the Contractor for whom the sleeve was provided.

The Plumbing, Heating and Ventilation and Electrical Contractors shall provide all sleeves in sufficient time to facilitate installation. Where sleeves are to be provided in concrete walls, the Plumbing, Heating and Ventilation and Electrical Contractors shall be present at the site prior to the pour to insure the correct locations of the sleeves or openings. In the event that no Plumbing, Heating and Ventilation or Electrical Contracts have been awarded at the time of the concrete pour, the General Contractor shall install sleeves or box out for plumbing, heating and ventilation and electrical equipment. Locations and sizes shall be obtained from the Engineer. Failure to install such sleeves or openings will result in the General Contractor performing or being back charged the additional cost of cutting and patching performed later.



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41. Cutting, Patching and Digging

The General Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon, or reasonably implied by, the drawings and specifications, for the completed structure, and he shall make good after them as the Engineer may direct.

Any cost caused by defective or ill-timed work shall be borne by the party responsible thereof. The Engineer shall be the sole judge of the responsible party.

The General Contractor and all other Contractors shall not endanger any work by cutting, digging or otherwise, and shall not cut or alter the work of any other Contractor save with the consent of the Engineer. All cutting and patching of the General Contractor's work for work and equipment of the other trades shall be done by the General Contractor and the cost of such paid by the responsible party mentioned above.

42. Excavation and Backfill

All excavation and backfilling within buildings, tanks, vaults, etc., unless otherwise specified shall be the responsibility of the General Contractor under the General Construction contract. Excavation and backfilling required for installation of materials or equipment in other areas shall be the responsibility of each Contractor performing the work under his respective contract. Backfill shall be consolidated in accordance with the specifications for consolidation of backfill under the General Construction Contract..

43. Cleaning and Final Inspection

All pipe lines, structures and the construction site shall be kept clean during construction, and as the work approaches completion, the Contractor shall systematically and thoroughly clean and make any needed repairs to the same. He shall furnish at his own expense suitable tools and labor for cleaning out all dirt, mortar and foreign substances from the structures, and also the water for cleaning by flushing. Any leakage of water into any structure exceeding the limits specified, or any deviation from the proper grade for alignment to the structure or any other defect such as to make the work, in the opinion of the Engineer, fall short of first-class work, shall be properly corrected by the Contractor at his own expense. The cleaning and repairs shall be arranged, so far as practicable, to be completed upon finishing the construction work. Notice to begin this cleaning and repair if such is needed, will be given in due season by the Engineer who, at the same time, will make his final inspection of the work.

The Engineer will not prepare his final certificate of this portion of the work until after the final inspection is made. During this final inspection, the Contractor, at his own expense, shall furnish suitable provisions as to needed drainage, workmen, and appliances.



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44. Removal of Temporary Structures

On or before the completion of the work, the Contractor shall, without charge therefore, tear down and remove all buildings and other structures built by him for facilitating the carrying out of the work and shall remove all rubbish of all kinds from the grounds which he has occupied, and shall leave the site of the work clean and in good condition.

45. Restoration

The Contractor shall restore all disturbed areas in kind. Restoration of grassed areas including any seeding, fertilizing, etc., required shall be in accordance with the Landscaping and Seeding Specifications. Restoration in paved areas shall be by means of temporary asphalt pavement, or as shown on the CONTRACT DRAWINGS.

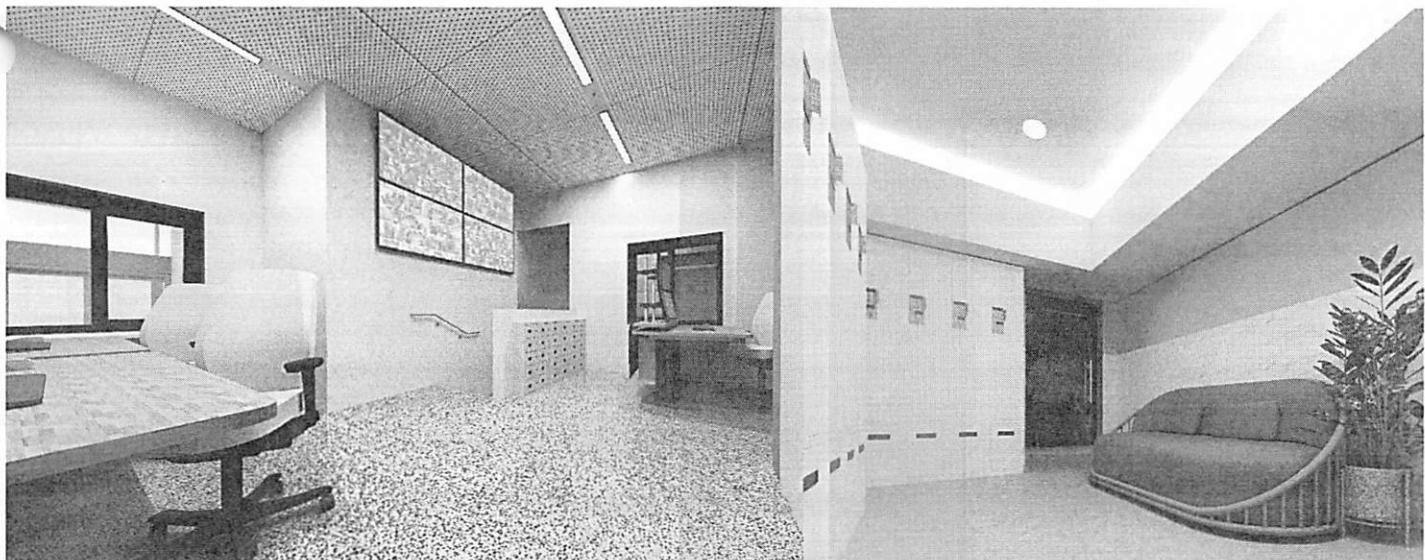
TECHNICAL SPECIFICATIONS

**CITY OF LONG BEACH
NASSAU COUNTY, NEW YORK**

POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER INCLUDING LOCKER ROOM / BATHROOM UPGRADE

October 31, 2024

**1 West Chester Street
Long Beach, NY 11561**



SECTION 00 01 10

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SECTION 00 01 15

LIST OF DRAWING SHEETS

The drawings listed below accompanying this specification form a part of the contract.

<u>Drawing No.</u>	<u>Title</u>
GENERAL	
T-000	TITLE SHEET
LIFE SAFETY	
LS-101	DISPATCH OFFICE – LIFE SAFETY PLAN
LS-102	LOCKER ROOM AND TOILET & BATH – LIFE SAFETY PLAN
DEMOLITION	
DM-101	LEVEL 1 – DISPATCH OFFICE DEMOLITION PLAN
DM-102	LEVEL 2 – LOCKER ROOM DEMOLITION PLAN
ARCHITECTURAL	
A-001	GENERAL NOTES, SYMBOLS, ABBREVIATIONS, MOUNTING HEIGHT, SITE PLAN
A-002	PARTITION TYPES
A-003	ACCESSIBILITY DIAGRAMS
A-101	DISPATCH OFFICE – FLOOR PLAN
A-102	DISPATCH OFFICE – WALL PARTITION PLAN
A-103	LOCKER ROOM AND TOILET & BATH – FLOOR PLAN & WALL PARTITION PLAN
A-151	DISPATCH OFFICE – FINISHES PLAN
A-152	DISPATCH OFFICE – CEILING FINISHES PLAN
A-153	LOCKER ROOM AND TOILET & BATH – FLOOR & CEILING FINISHES PLAN
A-201	DISPATCH OFFICE – REFLECTED CEILING PLAN
A-202	LOCKER ROOM AND TOILET & BATH – REFLECTED CEILING PLAN
A-301	DISPATCH OFFICE – INTERIOR ELEVATIONS
A-302	LOCKER ROOM AND TOILET & BATH – INTERIOR ELEVATIONS
A-401	DISPATCH OFFICE – SECTIONS
A-402	LOCKER ROOM AND TOILET & BATH – SECTIONS
A-701	DISPATCH OFFICE – FURNITURE LAYOUT
A-702	LOCKER ROOM AND TOILET & BATH – FURNITURE LAYOUT
A-801	CEILING DETAILS
A-802	STAIRS, CELL & WATERPROOFING DETAILS

10/31/2024
Issued For Bid

City of Long Beach
Police Department Dispatch Communication Center
Including Locker Room / Bathroom Upgrade
1 West Chester Street, Long Beach, NY 11561
Ai-Alt File No. 23148.00

A-901 DOOR & WINDOW SCHEDULE

STRUCTURAL

- S-001 STRUCTURAL GENERAL NOTES
- S-002 GENERAL NOTES & DESIGN CRITERIA
- S-003 ABBREVIATIONS, SYMBOLS & NOTATIONS
- S-101 DISPATCH OFFICE PARTIAL FRAMING PLAN
- S-102 LEVEL 2 PARTIAL FRAMING PLAN
- S-400 MASONRY TYPICAL DETAILS

ELECTRICAL

- E-001 ELECTRICAL NOTES, SYMBOLS & DETAILS
- E-101 ELECTRICAL DIAGRAM
- E-301 LEVEL 1 POWER PLAN
- E-302 LEVEL 2 POWER PLAN
- E-303 LEVEL 3 POWER PLAN
- E-401 LEVEL 1 LIGHTING PLAN
- E-402 LEVEL 2 LIGHTING PLAN
- E-501 ELECTRICAL DETAILS

MECHANICAL

- M-001 MECHANICAL SYMBOLS, ABBREVIATIONS & NOTES
- M-101 DISPATCH OFFICE – MECHANICAL PLAN
- M-102 LEVEL 2 – TOILET & BATH MECHANICAL PLAN
- M-301 MECHANICAL SCHEDULES
- M-401 MECHANICAL RISER DIAGRAM
- M-501 MECHANICAL DETAILS

PLUMBING

- P-001 PLUMBING LEGEND, NOTES & PLOT PLAN
- P-101 LEVEL 2 T&B SANITARY AND VENT PLAN
- P-102 LEVEL 2 T&B DOMESTIC WATER PLAN
- P-201 PLUMBING RISER DIAGRAMS
- P-301 PLUMBING DETAILS

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Selective demolition and removal as shown on Drawings.
 - 1. Removal of existing diesel generator (Caterpillar) at Ground floor, Boiler Room.
 - 2. Demolition of exit door frame of Boiler Room to meet the clearance required for the egress of the existing diesel generator.
 - 3. Removal of existing day tank for the existing diesel generator.
 - 4. Demolition and removal of fuel piping for the existing diesel generator.
 - 5. Removal of existing generator control board.
 - 6. Removal of existing generator muffler and exhaust duct.
 - 7. Removal of existing battery rack and batteries for the existing diesel generator.
 - 8. Removal of existing cable wire connecting the existing diesel generator to the main distribution frame.
 - 9. Removal of Diesel fuel from diesel generator and day tank.
- B. Related Documents
 - 1. Division 01 Section "Photographic Documentation" for preconstruction photographs captured before selective demolition operations.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 3. Division 01 Section "Execution" for cutting and patching procedures.
 - 4. MEP documents for coordinating MEP demolition and removals.

1.02 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvage or reinstalled.
- B. Demolish and remove: To forcibly remove by means of destroying existing construction and dispose of them off-site.
- C. Existing: Already in place or in existence

1.03 SUBMITTALS

- A. Qualification Data: For demolition firm and professional engineer.
- B. 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.
 - 2. Coordination for shutoff, capping and continuation of utility services.
 - 3. Location of proposed dust and noise control temporary partitions and means of egress.
 - 4. Means of protection for items to remain and items in path of waste removal from building.

5. Items to be removed and reinstated, and items to be removed and salvaged.
- C. Proposed Protection Measures: Submit report, including drawings, which indicates the measurements proposed for protecting individuals and property, and for dust control and noise control. Indicate proposed locations and construction of barriers.
- D. Pre-demolition Photographs or Video: Submit before work begins in accordance with Division 01 Section "Photographic Documentation."
- E. Disposal: Provide evidence of proper disposal of Generator, day tank, fuel piping, control board, Muffler, exhaust duct, battery rack, batteries, cable wire and diesel fuel.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.04 QUALITY ASSURANCE

- A. Demolition firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated but not limited for this Project.
- B. Pre-demolition Conference: Conduct conference at Project site to comply with requirements under Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to the following:
 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.
 6. Review the requirements for temporary bracing of structural walls.

1.05 FIELD CONDITIONS

- A. Building will continue to operate. Conduct selective demolition building operations will not be affected.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Building Management as far as practical.
- C. Notify Architect or Project Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work [due to Owner pre-initiation of hazard material abatement]. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect/Project Engineer and Owner. Owner will remove hazardous materials under a separate contract.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations. Maintain fire-protection facilities in service during selective demolition operations.
- F. Storage or sale of removed items or materials on-site is not permitted.

1.06 WARRANTIES

- A. Existing Warranties: Verify with Owner's Representative if any existing warranties are in effect for materials and/or equipment that may be affected by selective demolition operations.
 - 1. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
 - 2. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 – PRODUCTS

2.01 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 ANSI/ASSE A10.6 and NFPA 241

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extend of selective demolition required.
- C. Inventory and record the condition of items to be removed.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extend of conflict. Promptly submit a written report to Architect/Project Engineer.
- E. Survey of Existing Conditions: Record existing conditions by use of measure drawings and preconstruction photographs.
- F. Progress Surveys: Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.02 PREPARATION

- A. Temporary Facilities: 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 protect occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 3. Cover and protect equipment.
 - 4. Cover and protect connecting stairs.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling, specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Shoring: 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.

3.03 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: Located, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Demolish, remove, demount, and disconnect abandoned mechanical materials and equipment indicated to be removed and not indicated to be salvaged or saved.
 2. Demolish, remove, demount, and disconnect inactive and obsolete piping, fittings and specialties, equipment, ductwork, controls, fixtures, and insulation. Services and sections of services rendered obsolete shall be removed. Do not abandon them in place.
 3. Where entire wall is to be removed, existing services/systems shall be removed with removal of the wall. Cap, valved, or plug and seal remaining portion of pipe, duct, or conduit.
 4. Piping and ducts embedded in floors, walls and ceilings may remain if such materials do not interfere with new installations. Remove materials above accessible ceilings.
 5. Removal, repair or replacement of material and equipment shall include associated items such as supports, fastenings, concrete equipment pads, conduits, flashings, adhesive, etc.
- C. Repairs or Replacements: The work specified herein shall also include repair or replacement to existing systems, wherever such systems are disturbed or otherwise damaged during the execution of work as specified.
- D. Disposal and Cleanup: Remove from the site and legally dispose of demolished materials and equipment not indicated to be salvaged, not required for reuse, nor shown to be reset or relocated.

3.04 SELECTIVE DEMOLITION

- A. General: Demolish and removed existing construction and equipment only to the extent required by new construction as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Conduct selective demolition and debris-removal operations to ensure minimum interference with other adjacent occupied and used facilities.
 2. Proceed with selective demolition systematically in order as determined. Complete selective demolitions operations above each floor or tier before disturbing supporting members on the next lower level.

3. 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, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 5. 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 fire watch and portable fire-suppression devices during 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. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Legally dispose of demolished items and materials promptly off-site.
- B. Removed and Salvaged Item to Be Re-installed:
1. Clean salvaged item.
 2. Pack or crate item after cleaning. Identify contents of containers.
 3. Store item in a secure area until delivery to Owner.
 4. Transport to Owner's storage area on-site designated by Owner.
 5. Protect items from damage during transport and storage.
 6. At time designated by Owner:
 - a. Clean and repair items to functional condition adequate for intended reuse.
 - b. Pack or crate items after cleaning. Identify contents of containers.
 - c. Protect items from damage during transport and storage.
 - d. Reinstall items in locations indicated. Comply with installations requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. 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.

3.05 SELECTIVE DEMOLITION PRECEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driver saw, cut concrete to a depth of at least $\frac{3}{4}$ inch (19mm) 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. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- D. 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 Division 07 Roofing Sections for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
 2. Remove existing roofing system down to substrate.
- E. Removal of Sealant: Remove cured sealant with stiff scrapers. Remove remaining sealant using a low VOC commercial stripper in accordance with the manufacturer's written instructions. Rinse area as thoroughly with clean, clear water, and allow to dry. Repeat Process until concrete surface is clean enough to receive new sealant.
- F. Tile Flooring: Remove floor tiles, grouts, mortars, and adhesives according to recommendations of Tiles Council of North America (TCNA). Do not use solvent-based products to remove adhesives.
- G. 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.
1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RPCI.
- H. Carpet and Carpet Tiles: Remove carpet, carpet tiles and adhesives according to recommendations of the Carpet and Rug Institute. Do not use methods requiring solvent-based adhesive strippers.
- I. Acoustical Panel Ceilings and Grid: Remove existing ceiling panels and grid in accordance with industry standards. Remove grid at the joints. Do not cut grid.
- J. Terra Cotta Tiles: Remove existing grout and mortars according to recommendations of the Tile Council of North America (TCNA). Clean, catalogue and store for reuse elsewhere.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
- B. Burning: Do not burn demolished materials.

3.07 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before elective demolition operations began.

3.08 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Items to be Removed, Salvaged and Re-installed: Include, but are not necessarily limited to the following:
 1. Other items indicated in the Drawings.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Grout.
 - 3. Shear studs.
- B. Related Sections:
 - 1. Division 1 Section "Code Required Structural Special Inspections and Procedures" for independent testing agency procedures and administrative requirements.
 - 2. Division 5 Section "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
 - 3. Division 5 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
 - 4. Division 9 Sections for final coatings.

1.02 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303.
- B. Heavy Sections: Rolled and built-up sections as follows:
 - 1. Shapes included in ASTM A 6 with flanges thicker than 1-1/2 inches.
 - 2. Welded built-up members with plates thicker than 2 inches.
 - 3. Column baseplates thicker than 2 inches.

1.03 PERFORMANCE REQUIREMENTS

- A. Connections: Submit details of connections, including comprehensive engineering design by a qualified licensed professional engineer registered in the State of Minnesota, to resist loads and reactions indicated on the Drawings and to comply with other information and restrictions indicated. Submit details and calculations for review before preparation of detail drawings.

1.04 SUBMITTALS

- A. Product Data and Test Reports: Submit copies of manufacturer's specifications and installation instructions for each proprietary product, including laboratory test reports and such other data as may be required to show compliance with the specifications. Indicate by transmittal form that copies of such data have been distributed to Fabricator/Installer and the Owner's Testing Agency.
 - 1. Certified copies of mill reports covering the chemical and physical properties of the steel.
 - 2. High-strength bolts, nuts, and washers, each type, including mechanical properties and chemical analysis.

3. Direct-tension indicators.
 4. Tension-control, high-strength bolt-nut-washer assemblies.
 5. Unfinished bolts and nuts.
 6. Welding electrodes, each type.
 7. Shear studs.
 8. Shop coat primer paint.
 9. Non-shrink grout.
- B. Shop Drawings: Show fabrication of structural-steel components.
1. Include drawing index sheets, including updated sheets, at the same time that details are submitted.
 2. Include detail drawings showing complete details for the fabrication of all structural steel members and components, including but not limited to: identification marks, dimensions, size, type, weight, grade of steel, cuts, connections, splices, camber, holes, requirements for installation of other materials or parts of construction, cleaning requirements prior to painting, type and dry-thickness of paint, and other pertinent data.
 3. Include baseplate and anchor rod plans showing the location, size, and identification marks of all baseplates, bolts, grades of steel, and setting elevations.
 4. Include embedment drawings showing the location, size, and identification marks of all embedments, bolts, studs, grades of steel, and setting elevations.
 5. Include erection plans (minimum 1/8" = 1'-0" scale) showing type, size, weight and identification marks of all structural steel members. Include temporary members required for erection, dimensions locating all members relative to column grid lines, elevations of all members, and clear cross references with all other related Drawings.
 6. 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.
 7. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 8. Include structural design data, calculations, and details signed and sealed by the qualified licensed professional engineer responsible for their preparation.
- C. Qualification Data: For installer, fabricator, professional engineer responsible for design of connections, licensed surveyor, shop-paint applicator, and testing agency.
- D. Welding certificates.
- E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- F. Source quality-control reports.
1. Contractor's Shop Testing Reports: Submit in triplicate directly to the Architect/Engineer with copies to the Contractor, Owner's Testing Agency and others as indicated. Document all of the certifications, tests and inspections specified.
 2. Owner's Testing Agency Reports: Submit in triplicate directly to the Architect/Engineer, with copies to the Contractor and others as indicated. Document all of the certifications, tests and inspections specified.
 3. Source quality-control reports shall clearly indicate all pertinent data, including but not limited to the following: date; time; weather conditions; name and qualifications of inspector; certifications, tests and/or inspections performed; equipment used; location of structural member or assembly within the building; whether or not the test results indicate compliance with the specifications, etc

- G. Field quality-control reports:
1. Owner's Testing Agency Reports: Submit in triplicate directly to the Architect/Engineer, with copies to the Contractor and others as indicated. Document all of the certifications, tests and inspections specified.
 2. Source field quality-control reports shall clearly indicate all pertinent data, including but not limited to the following: date; time; weather conditions; name and qualifications of inspector; certifications, tests and/or inspections performed; equipment used; location of structural member or assembly within the building; whether or not the test results indicate compliance with the specifications, etc.
- H. Record Survey: Submit three (3) copies of certified survey(s) by the Contractor's licensed professional surveyor registered in the state of Minnesota as specified in Part 3 - Execution.
- I. Substitutions: Substitutions for the member sizes, type(s) of steel, connection details, or any other modifications proposed by the Contractor will be considered by the Architect/Engineer under the following conditions:
1. The revisions in no case result in additional cost to the Owner. In considering cost savings to the Owner, adequate compensation for the Architect/Engineer's review of these substitutions should be considered.
 2. The request is made in writing and accepted prior to the submission of shop drawings.
 3. It is suitably demonstrated that there is a substantial cost advantage or time advantage to the Owner.
 4. Sufficient drawings, engineering calculations by a licensed professional engineer registered in the State of Minnesota, and other data are submitted to facilitate review by the Architect/ Engineer.
- J. Corrective work: Report any structural steel members or assemblages having fabrication errors, installation errors, or deformations preventing proper assembly and fitting of parts to Architect/ Engineer upon discovery. Corrective work proposed by the Contractor will be considered by the Architect/Engineer under the following conditions:
1. Corrective work will in no case result in additional cost to the Owner.
 2. The request is made in writing and accepted prior to performing corrective work.
 3. Sufficient drawings, engineering calculations by a licensed professional engineer registered in the State of New York, and other data are submitted to facilitate review by the Architect/ Engineer.
- K. Minutes of preconstruction conference.

1.05 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. If the Fabricator's facility is not AISC certified, the Owner's independent testing agency will perform all shop testing and inspection work, and the fabricator will be backcharged for this work. Refer to Paragraph "Source Quality Control" for additional information.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. If the installer is not AISC certified, refer to Paragraph "Erection Quality Control" for additional information.

- C. Shop-Painting Applicators: Qualified according to AISC SPE "Sophisticated Paint Endorsement" or SSPC-QP 3 "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
- E. Comply with applicable provisions of the following specifications and documents:
 1. American Institute of Steel Construction (AISC) 303 "Code of Standard Practice for Steel Buildings and Bridges"
 2. AISC 341 and AISC 341s1 "Seismic Provisions for Structural Steel Buildings"
 3. AISC 360 "Specification for Structural Steel Buildings"
 4. ASTM International (ASTM) A 6, "Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling"
 5. ASTM A 36, "Specification for Carbon Structural Steel"
 6. ASTM A 53, "Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded, and Seamless"
 7. ASTM A 108, "Specification for Steel Bar, Carbon and Alloy, Cold-Finished"
 8. ASTM A 123, "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products"
 9. ASTM A 216, "Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service"
 10. ASTM A 325, "Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength"
 11. ASTM A 354, "Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners"
 12. ASTM A 435, "Specification for Straight Beam Ultrasonic Examination of Steel Plates"
 13. ASTM A 449, "Specification for Hex Cap Screws, Bolts, and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use"
 14. ASTM A 490, "Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength"
 15. ASTM A 500, "Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing"
 16. ASTM A 529, "Specification for High-Strength Carbon-Manganese Steel of Structural Quality"
 17. ASTM A 563, "Specification for Carbon and Alloy Steel Nuts"
 18. ASTM A 572, "Specification for High Strength, Low-Alloy Columbium-Vanadium Structural Steel"
 19. ASTM A 588, "Specification for High-Strength, Low-Alloy Structural Steel, up to 50 ksi Minimum Yield Point, with Atmospheric Corrosion Protection"
 20. ASTM A 668, "Specification for Steel forgings, Carbon and Alloy, for General Industrial Use"
 21. ASTM A 780, "Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings"
 22. ASTM A 847, "Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance"
 23. ASTM A 913, "Specification for High-Strength, Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST)"
 24. ASTM A 992, "Specification for Structural Steel Shapes"
 25. ASTM B 695, "Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel"
 26. ASTM C 1107, "Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)"
 27. ASTM E 94, "Guide for Radiographic Examination"
 28. ASTM E 119, "Test Methods for Fire Tests of Building Construction and Materials"
 29. ASTM E 164, "Practice for Ultrasonic Contact Examination of Weldments"
 30. ASTM E 165, "Test Method for Liquid Penetrant Examination"
 31. ASTM E 709, "Guide for Magnetic Particle Examination"
 32. ASTM E 1444, "Standard Practice for Magnetic Particle Testing"

33. ASTM F 436, "Specification for Hardened Steel Washers"
34. ASTM F 959, "Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners"
35. ASTM F 1554, "Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength"
36. ASTM F 1852, "Standard Specification for 'Twist-Off' Type Tension Control Structural Bolt / Nut / Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength"
37. American Welding Society (AWS) D1.1, "Structural Welding Code - Steel"
38. AWS D1.8, "Structural Welding Code - Seismic Supplement"
39. International Fastener Institute (IFI) "Handbook on Bolt, Nut, and Rivet Standards"
40. Master Painter Institute (MPI) #18, "Primer, Zinc-Rich, Organic"
41. MPI #19, "Primer, Zinc-Rich, Inorganic"
42. MPI #20, "Primer, Zinc-Rich, Epoxy"
43. MPI #79, "Primer, Alkyd, Anti-Corrosive for Metal"
44. MPI #107, "Primer, Rust-Inhibitive, Water-Based"
45. National Association of Corrosion Engineers (NACE) No. 3, "Commercial Blast Cleaning"
46. Research Council on Structural Connections (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts"
47. Steel Structures Painting Council (SSPC) "Steel Structures Painting Manual, Volumes 1 and 2"
48. SSPC PA1, "Shop, field, and Maintenance Painting of Steel"
49. SSPC QP3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators"
50. SSPC-SP3, "Power Tool Cleaning"
51. SSPC-SP6, "Commercial Blast Cleaning"
52. Keep copies of these codes and standards available in shop and field.
53. In case of conflict between specified codes and standards, the most stringent requirements govern. In case of conflict between specified codes and standards and project Specifications, project Specifications govern.

F. Preconstruction Conference: Conduct conference at Project site.

1. Conduct a meeting prior to the preparation of shop drawings to review the detailed requirements for preparing calculations and shop drawings, sequence of submittals, erection tolerances, welding qualifications, inspection procedures, surveys and other similar matters.
2. Responsible representatives from all concerned parties are required to attend the meeting including, but not limited to, the following:
 - a. Construction Manager's superintendent
 - b. Contractor's superintendent
 - c. Architect/Engineer
 - d. Structural steel detailer and/or fabricator
 - e. Erector
 - f. Steel Deck Installer
 - g. Owner's Testing Agency
 - h. Surveyor
3. Record and distribute legible meeting minutes to all parties in attendance at the meeting and an additional copy to the Owner's representative.

1.06 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 to, damage to, or overload 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.

1.07 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' 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.

PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove these blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. 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 the following:
 1. W-Shapes: 60 percent.
 2. Channels and Angles: 60 percent.
 3. Plate and Bar: 25 percent.
 4. Cold-Formed Hollow Structural Sections: 25 percent.
 5. Steel Pipe: 25 percent.
 6. All Other Steel Materials: 25 percent.
- C. Regional Materials: Provide structural steel members that have been produced within 500 miles of Project site.
- D. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove these blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- E. W-Shapes: ASTM A 992.
- F. Channels and Angles: ASTM A 36.

- G. Plate and Bar: ASTM A 36 or ASTM A 572 as indicated.
- H. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- I. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- J. Welding Electrodes: Conform to AWS D1.1, including addenda and the following requirements:
 - 1. Shielded metal-arc welding (SMAW): AWS A5.1 and A5.5, E70 series.
 - 2. Submerged arc welding (SAW): AWS 5.17 and A5.23.
 - 3. Flux core arc welding (FCAW): AWS 5.20 and 5.29
 - 4. Metal inert gas welding (MIG) of structural steel is not permitted.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish. Subject to compliance with requirements, the following are acceptable:
 - a. Coronet Load Indicators by TurnaSure LLC.
 - b. Load Indicator Washers by Portland Bolt & Manufacturing Co.
 - c. Squirter DTI by Applied Bolting Technology.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish. Subject to compliance with requirements, the following are acceptable:
 - a. Coronet Load Indicators by TurnaSure LLC.
 - b. Load Indicator Washers by Portland Bolt & Manufacturing Co.
 - c. Squirter DTI by Applied Bolting Technology.
- C. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
 - 1. Finish: Hot-dip or mechanically deposited zinc coating.
 - 2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating finish.
- D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers; bearing-type connections only. Subject to compliance with requirements, the following are acceptable:
 - a. Tension Control Assemblies by LeJeune Bolt Co.
 - b. High Strength Positive Tension Shear Bolts by St. Louis Screw & Bolt.

- c. Tru-Tension Bolts by Nucor Fastener.
- E. Shear Studs: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- F. Unheaded Anchor Rods: ASTM F 1554.
 - 1. Nuts: ASTM A 563.
 - 2. Plate Washers: ASTM A 36.
 - 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 - 4. Finish: match connected construction.
- G. Threaded Rods: ASTM A 36.
 - 1. Nuts: ASTM A 563.
 - 2. Washers: ASTM F 436, Type 1, hardened.
 - 3. Finish: to match connected construction.
- H. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- I. Expansion Anchors: Install in accordance with manufacturer's printed instructions. Properly account for fastener spacing, embedment, edge distance, and strength of substrate. Use only with prior review and acceptance by Architect/Engineer for the specific applications indicated. Subject to compliance with requirements, the following manufacturers are acceptable:
 - a. Hilti North America
 - b. Simpson Strong-Tie Co., Inc.
 - c. Powers Fasteners.
 - d. ITW Redhead.
- J. Epoxy Adhesive Anchors: Install in accordance with manufacturer's printed instructions. Properly account for fastener spacing, embedment, edge distance, and strength of substrate. Use only with prior review and acceptance by Architect/Engineer for the specific applications indicated. Subject to compliance with requirements, the following manufacturers are acceptable:
 - a. Hilti North America
 - b. Simpson Strong-Tie Co., Inc.
 - c. Powers Fasteners.
 - d. ITW Redhead
- K. Elastomeric Bearing Pads: Comply with AASHTO "Standard Specification for Highway Bridges." Minimum durometer rating of 60.
- L. Structural Slide Bearings: Low-friction assemblies, of configuration indicated, that provide vertical transfer of loads and allow horizontal movement perpendicular to plane of expansion joint while resisting movement within plane of expansion joint.
 - 1. Mating Surfaces: PTFE and mirror-finished stainless steel.
 - 2. Coefficient of Friction: Not more than 0.06 at pressures over 600 psi as installed.
 - 3. Bearing pads are chemically inert, weatherproof, and require no maintenance.
 - 4. Subject to compliance with requirements, the following are acceptable:
 - a. Amscot Structural Products Corp.

- b. Fluorocarbon Company Limited.
 - c. R.J. Watson Bridge & Structural Engineered Systems.
 - d. Seismic Energy Products, L.P.
 - e. Con-Serv Inc.
5. Other products will be considered only if the request is accompanied by certified test reports showing compliance with the requirements above.

2.03 PRIMER

- A. Primer: Compatible with Division 9 sections.
- B. Steel not exposed to view and not covered in sprayed fire-resistant materials: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#107.
- C. Steel exposed to view but not exposed to weather: semi-gloss acrylic-enamel finish - MPI INT 5.1S:
 - 1. MPI #107, VOC E Range of E2, Environmental Performance Rating of EPR 2. Acceptable products include:
 - a. Super Spec High Performance Acrylic Metal Primer P04/KP04 by Benjamin Moore.
 - b. Devoe Coatings Devflex DTM Primer & Flat Finish by ICI Paints
 - c. Pro Industrial Pro-Cryl Universal Primer by Sherwin-Williams Co.
- D. Steel exposed to weather: polyurethane, pigmented, epoxy zinc-rich primer (for high-build epoxy coating system) - MPI EXT 5.1G
 - 1. MPI #20, VOC E Range of E2. Acceptable products include:
 - a. Devoe Coatings Catha-Cote 313 by ICI Paints.
 - b. PMC Americoat 68HS Zinc Rich Epoxy Primer by PPG.
 - c. Industrial & Marine Zinc Clad IV, B69A8/B69V8 by Sherwin-Williams Co.
 - d. Tneme-Zinc Series 90-97 by Tnemec.
- E. Other products will be considered only if the request is accompanied by certified test reports showing compliance with the requirements above.

2.04 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: Factory premixed grout with no drying, shrinkage or settlement at any age. Compressive strength per ASTM C-1107 of not less than 5,000 psi at 7 days and 8,000 psi at 28 days when placed in flowable consistency. Acceptable products include:
 - 1. Masterflow 555 by BASF.
 - 2. Hi-Flow Grout by Euclid Chemical Co.
 - 3. DuragROUT by L & M Construction Chemicals.
 - 4. 10K Grout by Bonded Materials Co.
 - 5. Five Star Grout by Five Star Products, Inc.
 - 6. Other products will be considered only if the request is accompanied by certified test reports showing compliance with the requirements above.

2.05 CONNECTION DESIGN

- A. Design and detail all connections to resist the loads and reactions indicated on the Drawings or specified herein. Use details consistent with the details indicated on the Drawings, supplementing where necessary. The details indicated on the Drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Architect/Engineer of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Architect/Engineer.
- B. A combination of bolts and welds to transmit loads in the same faying surface is not permitted.
- C. Use beam-to-column connections which minimize the eccentric loading on the column. Detail and fabricate unrestrained simple beam end connections to minimize end restraint of the beam. Design all parts of such connections (such as welds, bolts, and material) taking eccentricity into account.
- D. All simple connections shall be single-plate or double-angle connections unless otherwise indicated on the Drawings. The use of single-angle connections is permitted for beams and channels with a nominal depth not greater than 10 inches and with an end reaction not greater than 10 kips. Other types of simple connections are prohibited without the prior written approval of the Architect/ Engineer.

2.06 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303 and 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 and maintain markings until structural steel has been erected.
 - 4. Mark and match-mark materials for field assembly. Use marks which agree with those indicated on the Shop Drawings and Erection Drawings.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting:
 - 1. Perform manual oxygen cutting only with a mechanically guided torch, except as permitted below:
 - a. Gas cut edges which are not to be welded and which will be free of substantial stresses (as determined by the Architect/Engineer) may be cut manually with an unguided torch provided that specified AISC edge distances to holes are maintained.
 - b. Gas cut edges which will be subjected to substantial stress (over 1/2 the allowable stress, as determined by the Architect/Engineer), or which are to be welded may be cut manually with an unguided torch to a line not within 1/8" of the finished dimension. Complete the final removal of material by chipping or grinding to produce a surface quality equal to that of the base metal edges.
 - 2. Do not oxygen cut holes for bolted connections; components prepared in this manner will be rejected.
 - 3. Shape all re-entrant corners notch-free to a radius of at least 1/2 inch.

4. Cut only those openings of the size and location indicated on the reviewed Shop Drawings.
- C. Punching, Drilling, and Reaming:
 1. Material may be punched 1/16" larger than the nominal diameter of the bolts. Wherever the thickness of metal is greater than 7/8" or is greater than the diameter of the bolts plus 1/8", drill or subpunch holes and ream. The diameter for subpunched holes shall be 1/16" smaller than nominal diameter of bolt accommodated. Locate finished holes to insure passage of bolts through assembled materials without drifting. Enlarge holes to receive bolts by reaming. Remove burrs caused by punching or reaming before assembly of bolted joints or members.
 2. Drill or punch holes at right angles to the surface of the metal. Do not make or enlarge holes by burning. Clean-cut holes without torn or ragged edges.
 3. Punch and drill steel for attachment of other materials indicated on the Drawings or noted in the Specifications to be attached to the steel. Use suitable templates for proper location of this work. Provide slotted holes for adjustment where indicated.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads. Completely assemble and weld member attachments prior to milling of surfaces.
- E. Built-Up Sections: Provide built-up sections free of warpage and with all axes in true alignment.
- F. Embedded Plate Headed Studs - Prepare steel surfaces as recommended by the manufacturer of the headed studs. Shop weld studs, spaced as indicated, to the steel member. Use automatic end welding of the headed-stud connectors in accordance with the manufacturer's printed instructions.
- G. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."

2.07 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. Use bolts of a length that will extend at least 1/4" beyond the nuts in the completed connection. Enter bolts into the holes without damaging the thread.
 2. Provide a calibrated bolt tension indicating device at the jobsite. Use the device to confirm the suitability both of the component parts of the fastener assembly and of the selected installation techniques. Tighten representative samples of each bolt type and size in the device to demonstrate both proper snug tight conditions and the additional tightening necessary to develop the bolt pretension prescribed in Table 8.1 of the RCSC "Specification." Use the device to insure that the installation wrenches and pneumatic supply are of adequate capacity.
 3. Correct poor matching of holes by drilling hole to the next larger bolt size and using the larger size bolt, if approved by the Architect/Engineer.
 4. Assemble joints without the use of separate erection bolts. Install bolts using powered impact wrenches of sufficient capacity and with an adequate supply of air.
 5. Bring all plies of the connection into firm contact by tightening all bolts to a snug tight condition. Progress systematically from the most rigid portion of the joint out to the joint free edges. Retighten any bolts which may have loosened during the assembly process. Protect bolt heads and nuts during assembly and tightening.
 6. Tighten bolts in connections identified as tension or slip-critical connections to the pretension levels specified in Table 8.1 of the RCSC "Specification." Acceptable methods of tightening pretensioned bolts include Direct Tension Indicators or the turn-of-the-nut method. Twist-off

torque bolts are not an acceptable alternate fastener for slip critical connections. Follow the manufacturer's written instructions for the proper installation of Direct Tension Indicators.

- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Remove paint, grease, loose scale and foreign matter from the surfaces to be welded. Clean the welds each time the electrode is changed or a new pass is started. Chip clean burned or flame cut edges before depositing welds.
 2. Do not begin structural welding until joint elements are bolted or tacked in intimate contact and adjusted to the dimensions indicated, with allowance for any weld shrinkage that is expected. Hold component parts of built-up members with clamps or other means to keep parts straight and in close contact. Take precautions to minimize "lock-up" stress and distortion due to heat.
 3. Welds not otherwise specified are continuous fillet welds. Use the minimum fillet size in accordance with AISC unless specifically noted otherwise.
 4. Weld heavy sections and those having a high degree of restraint with low hydrogen electrodes. Perform intermittent welding, continuous welding and straightening of built-up sections to minimize internal stresses.
 5. The same electrode may be used with various thicknesses of plate, but adjust the current used and the number of passes proportionately.
 6. Do not weld in a wind unless wind protection is provided. Do not splice members without prior approval or review by the Architect/Engineer.
 7. After being deposited, brush welds with wire brushes. Make welds which exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays and which are free of porosity and clinkers. Visual inspection of the edges and ends of fillets and butt joint welds must indicate good fusion, with penetration into the base metal. Cut out and replace defective welds.
 8. Adjustable Veneer Anchors: Welders attaching adjustable veneer ties to structural steel shall hold current AWS certification.

2.08 SUPPLEMENTAL FRAMING

- A. Provide supplemental framing as follows:
1. At all openings as indicated on the Drawings.
 2. Edges of metal deck, hollow-core plank, open grating flooring, etc., not otherwise supported by structural framing.
 3. At all suspended loads.
- B. Where open web joists are used, provide additional framing to transfer loads from the supplemental framing and suspended loads to joist panel points.

2.09 SHOP PRIMING

- A. Shop prime all steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 5. Galvanized surfaces.
 6. Surfaces to receive metal deck and/or shear studs fastened by welding.
 7. Machine-finished surfaces (e.g., bearing surfaces of columns and column baseplates).

- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. Steel not exposed to view: SSPC-SP 3, "Power Tool Cleaning."
 2. Steel exposed to view and not exposed to weather: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 3. Steel exposed to view and exposed to weather: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning"
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 2 mils. 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.

2.10 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

2.11 SOURCE QUALITY CONTROL

- A. For AISC-certified facilities, submit a written program for the proposed fabrication quality control testing and inspection. After review and acceptance of these documents by the Architect/Engineer, perform all shop testing and inspection as specified herein and as required for Fabricator's quality control testing and inspection program.
- B. For facilities not AISC-certified, the Owner's independent testing agency will perform all shop testing and inspection work listed herein, and the fabricator will be backcharged for this work.
- C. Owner's Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports. Provide the testing agency with the following:
1. Complete set of current reviewed shop and erection drawings.
 2. Full and ample means and assistance for testing.
 3. Access to and proper facilities (e.g., scaffolding, temporary work platforms, hoisting facilities, etc.) for inspection of the Work in the shop and field.
- D. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Structural Steel Fabrication Shop Quality Control Program: As a minimum, perform the following shop tests and inspections and submit daily reports of the results of all tests. State in each report whether the tested specimens conform to all requirements of the Contract Documents, and specifically note any discrepancies. If the inspections indicate defects in the Work, increase the degree of testing to insure

that the full extent of defects in the joint are found and that similar defects are not present in similar joints.

1. Submit evidence that all welders employed in the Work hold current AWS certification for the welding procedures that each will perform. If recertification of welders is required, the retesting is the Fabricator's responsibility.

- a. Visually and acoustically inspect all headed anchor studs used on connection plates embedded in concrete or mortar. Check the shear stud installation for indications of insufficient or improper welding. Strike each stud sideways with a 3-pound sledge hammer to produce a ringing sound. Studs producing a hollow sound shall be replaced or rewelded.
- b. Visually inspect all fabrication operations, including dimensional and fit-up/alignment and control.
- c. Visually inspect all plate edges and rolled shape edges for material defects.
- d. Visually inspect material in accordance with AWS D1.1
- e. Bolted Connections: Test and inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- f. Welded Connections: Test and inspect shop-welded connections according to AWS D1.1 and the following inspection procedures:

1) Visual Inspection :

- a) Inspect all welding operations and welds, including edge preparation, fit-up, preheat, and adherence to welding procedures. Inspect welds prior to shop painting of steel.
- b) Measure the weld profiles for 20% of the length of each weld, at random

2) Magnetic Particle Testing: Test in accordance with ASTM E 709 for a minimum of:

- a) 20% of all single plate connection fillet welds at random, final pass only.
- b) 20% of all continuity plate and bracing gusset plate fillet welds, at random, final pass only.
- c) 100% of tension member fillet welds (e.g., hanger connection plates and other similar connections) for root and final passes.
- d) 20% of length of built-up column member partial joint penetration and fillet welds at random for root and final passes.
- e) 100% of length of built-up girder member partial joint penetration and fillet welds for root and final passes.

3) Ultrasonic Testing: Test in accordance with ASTM E 164 for 100% of all complete joint penetration welds, braced and moment frame column splices, and a minimum of 20% of all other partial penetration column splices, at random.

g. Ultrasonically test in accordance with ASTM A435 for laminations or other material defects at the following locations:

- 1) Column flanges and other plate material greater than 1-1/2" in thickness in the zone of welded beam/column moment connections. Extend the test area 9 inches above and below each beam flange and/or continuity plate, scanning 100% of the test area.
- 2) Built-up girder flange plates 2" or more in thickness for laminations. Extend the testing area for the full width of the flanges for 5'-0" on each side of the column transfer location.

2. Schedule all work to allow the testing requirements listed above to be completed.
3. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 1. Contractor's registered surveyor shall prepare and submit three (3) copies to the Architect/Engineer a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Report any discrepancies to the Architect/Engineer before proceeding with erection. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, flooring, planking, scaffolding, 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. The design, strength, safety and adequacy of all temporary bracing and methods of construction are the responsibility of the Contractor. This responsibility includes the safety and stability of the work at all stages of erection until the permanent lateral load resisting system of the structure becomes fully effective. No action by the Architect/Engineer will eliminate, lessen, or restrict this responsibility in any manner.
 2. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION QUALITY CONTROL

- A. If the steel installer is not AISC certified, submit the following:
 1. Evidence that all welders to be employed in the work hold current AWS certification for the welding procedures that each will perform.
 2. Written welding procedures. A copy of all welding procedures shall be kept on-site at all times. Confirm that written welding procedures are compliant with AWS specifications. Submit evidence that welding procedures are used by welders.
 3. Written bolt-tightening procedures. A copy of all bolt-tightening procedures shall be kept on-site at all times. Confirm that written bolt-tightening procedures are compliant with the Research Council on Structural Connections (RCSC) specifications. Submit evidence that bolt-tightening procedures are used by workers.
 4. Evidence that crane operators are certified by the National Commission for the Certification of Crane Operators or are equivalently trained and experienced.

5. Evidence that project-specific erection plans with hoisting and erection requirements are communicated and implemented in the field.

3.04 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base, Bearing, 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. Temporarily set plates for structural members on leveling nuts. Provide shims as required.
 2. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove shims but, if protruding and exposed to view, cut off flush with edge of plate before packing with grout.
 3. 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 instructions.
- C. Maintain erection tolerances of structural steel within AISC 303.
- 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 will be 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. Use drift pins only to bring parts together; do not use drift pins in a manner which distorts or damages structural members.
 3. 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 without prior written approval of the Architect/Engineer.
- G. Do not enlarge misaligned holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Studs: Prepare steel surfaces as recommended by manufacturer. Use automatic end welding of shear studs according to AWS D1.1 and manufacturer's written instructions.
- I. Install sliding connections of the design indicated. Exercise particular care during installation to ensure proper functioning of these connections as sliding joints.

3.05 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.
- B. Weld Connections: Comply with AWS D1.1 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. Use shielded metal arc or flux core welding for all field welding.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.
4. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

3.06 FIELD QUALITY CONTROL

- A. Owner's Testing Agency: Refer to Division 1 Section "Code-Required Structural Special Inspections and Procedures" for "Structural Steel" inspection and test requirements.
- A. Bolted Connections: Test and inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 1. Assign an identification symbol or mark to each bolting crew working on the project. Use this identification on each joint completed.
 2. Visually inspect all anchor-rod nut installation and tightening.
 3. Inspect the job site calibration of each size bolted fastener assembly and installation technique in the calibrated tension measuring device. Verify that the proper bolt pretension listed in Table 8.1 of the RCSC "Specification" is achieved and that installation equipment is of sufficient capacity.
 4. Periodically monitor field bolting procedures during bolt installation. Verify that all bolts in all connections are brought to a "snug tight" condition with all plies of the connection in firm contact. Verify that bolts in connections identified as either slip-critical or direct tension connections are being additionally tightened by the proper technique(s) determined in the tension testing device described above.
 5. Confirm that all bolted connections are being installed in accordance with the procedures outlined in the RCSC "Specification."
- B. Welded Connections: Visually inspect all field welds according to AWS D1.1.
 1. Provide temporary enclosures, shielding, etc., to protect joints to be welded against the elements during all welding operations.
 2. Magnetic Particle Testing: Test in accordance with ASTM E 709 for a minimum of:
 - a. 20% of the length of every field fillet weld, at random, final pass only.
 - b. 25% of the length of every field partial-joint-penetration groove weld, except column splices, at random, root and final passes.
 3. Ultrasonic Testing: Test in accordance with ASTM E 164 for a minimum of:
 - a. 100% of every field complete-joint-penetration groove weld.
 - b. 25% of the length of every field partial joint penetration column splice, at random.
- C. Testing agency shall submit inspection reports promptly and in writing to Architect/Engineer, Owner, and Contractor.
- D. After erection, remove all loose mill scale, loose rust, oil, grease, or other bond-inhibiting foreign substances from steel to receive spray-applied fire-resistive coating.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.07 FABRICATION AND ERECTION TOLERANCES

- A. Unless otherwise noted, level and plumb individual members of the structure to an accuracy of 1 in 500, and erect structural steel to within the tolerances specified in the AISC 303. Base all leveling and plumbing on the mean operating temperature of the structure. Make allowances for the differences in temperature at time of erection and the mean temperature at which the structure will be when completed and in service. Base all measurements relating to tolerances on the theoretical centerline of the columns. Plumb and align columns as follows:
 - 1. Columns adjacent to elevator shafts - accurate to 1:1000, not to exceed 1" for their full height.
 - 2. All exterior columns - within 1" of the theoretical centerline either toward or away from the building.
 - 3. The centerline of any two (2) adjacent exterior columns - within 3/4" of each other either toward or away from the building.
 - 4. All intermediate exterior columns - within 3/4" of a line between the corner columns.

3.08 FIELD SURVEYS OF COMPLETED STRUCTURE

- A. Establish benchmarks and survey the base structure for dimensional extremes before proceeding with erection to determine the range of any required compensating adjustments. Survey actual column locations, including vertical elevations and plumbness, immediately upon the completion of every tier of steel. Promptly submit report to the Architect/Engineer. Include resurvey of tier below. Should column locations vary beyond the allowable tolerances, promptly notify Architect/Engineer and submit proposed corrective measures to the Architect/Engineer for review and acceptance prior to proceeding with the work. Survey the final erected structural steel frame prior to the application of any other work, and report any discrepancies from Contract requirements to the Architect/ Engineer.

3.09 CORRECTIVE WORK

- A. Report to the Architect/Engineer any structural steel members or assemblages having fabrication errors, erection errors, or deformations preventing proper assembly and fitting of parts.
- B. Submit Drawings and Calculations to the Architect/Engineer showing the reasons for and details of proposed corrective work. Perform the corrective work only after the Architect/Engineer has reviewed and accepted the corrective procedures.
- C. Corrective work, including any additional tests that may be necessary to show compliance of corrected work, shall be performed at no additional cost to the Owner.
- D. All costs associated with the Architect/Engineer's review will be backcharged to the Contractor.

3.10 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: 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 3 power-tool cleaning.

END OF SECTION

SECTION 07 14 16

COLD FLUID-APPLIED WATERPROOFING

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. Polyurethane waterproofing.
2. Polyester waterproofing.
3. Latex-rubber waterproofing.

- B. Related Requirements:

1. Section 071800 "Traffic Coatings" for exposed, fluid-applied membrane with an integral wearing surface.
2. Section 079500 "Expansion Control" for plaza or foundation-wall expansion-joint assemblies that interface with waterproofing.
3. Section 093013 "Ceramic Tiling" for fluid-applied waterproof membranes beneath ceramic tiles.
4. Section 093033 "Stone Tiling" for fluid-applied waterproof membranes beneath ceramic tiles.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including, but not limited to, the following:

- a. Surface preparation specified in other Sections.
- b. Minimum curing period.
- c. Forecasted weather conditions.
- d. Special details and sheet flashings.
- e. Repairs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

- B. Shop Drawings:

1. Show locations and extent of waterproofing.

2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
 3. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.
- C. Samples: For each exposed product and for each color and texture specified, including the following products:
1. Flashing sheet, 8 by 8 inches (200 by 200 mm).
 2. Membrane-reinforcing fabric, 8 by 8 inches (200 by 200 mm).
 3. Insulation, 8 by 8 inches (200 by 200 mm).
 4. Drainage panel, 4 by 4 inches (100 by 100 mm).
 5. Plaza-deck paver, full size in each color and texture required.
 6. Paver pedestal assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.
 1. Build mockup for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatments, inside and outside corner treatments, and protection.
 - a. Size: 100 sq. ft. (9.3 sq. m) in area.
 - b. Description: Each type of wall and deck installation.
 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.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.
 1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F (3 deg C) above dew point.
 2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

- B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.8 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.
1. Warranty Period: 10 years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, on warranty form at end of this Section, signed by Installer, covering Work of this Section, for warranty period of two years.
1. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pavers on plaza decks.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and protection course from single source from single manufacturer.

2.2 SINGLE-COMPONENT POLYURETHANE WATERPROOFING

- A. Single-Component, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.
- B. Single-Component, Reinforced, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.

2.3 TWO-COMPONENT POLYURETHANE WATERPROOFING

- A. Two-Component, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.
- B. Two-Component, Unmodified Polyurethane Waterproofing: ASTM C 836/C 836M.
- C. Two-Component, Reinforced, Unmodified Polyurethane Waterproofing: ASTM C 836/C 836M.

2.4 POLYESTER WATERPROOFING

- A. Multicomponent, Reinforced, Unsaturated Polyester Waterproofing: ASTM C 836/C 836M.

2.5 LATEX-RUBBER WATERPROOFING

- A. Two-Component, Unreinforced, Latex-Rubber Waterproofing: ASTM C 836/C 836M; coal-tar free.
1. Hydrostatic-Head Resistance: 65 feet (20 m) minimum; ASTM D 5385.
- B. Two-Component, Reinforced, Latex-Rubber Waterproofing: ASTM C 836/C 836M; coal-tar free.
1. Hydrostatic-Head Resistance: 197 feet (60 m) minimum; ASTM D 5385.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.
 - 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated acrylic latex, polyurethane, or epoxy.
- C. Sheet Flashing: 50-mil- (1.3-mm-) minimum, nonstaining, uncured sheet neoprene.
 - 1. Adhesive: Manufacturer's recommended contact adhesive.
- D. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric, manufacturer's standard weight.
- E. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.
- F. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; ASTM C 920, Type M, Class 25 or greater; Grade NS for sloping and vertical applications and Grade P for deck applications; Use NT exposure] [as specified in Section 079200 "Joint Sealants"; and as recommended by manufacturer for substrate and joint conditions.
 - 1. Backer Rod: Closed-cell polyethylene foam.

2.7 PROTECTION COURSE

- A. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 - 1. Thickness: 1/8 inch (3 mm) or 1/4 inch (6 mm), nominal.
 - 2. Thickness: 1/8 inch (3 mm), nominal, for vertical applications; 1/4 inch (6 mm), nominal, elsewhere.
 - 3. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer.
- B. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness of 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) according to ASTM D 1621 and maximum water absorption by volume of 0.6 percent according to ASTM C 272.
- C. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on both sides with plastic film, nominal thickness of 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) according to ASTM D 1621 and maximum water absorption by volume of 0.6 percent according to ASTM C 272.
- D. Protection Course: Extruded-polystyrene board insulation with continuous surface skins on both faces intact, unfaced; ASTM C 578, Type X, 1/2 inch (13 mm) thick.
- E. Protection Course: Molded-polystyrene board insulation, ASTM C 578, Type I, 0.90-lb/cu. ft. (15-kg/cu. m) minimum density, 1-inch (25-mm) minimum thickness.

2.8 MOLDED-SHEET DRAINAGE PANELS

- A. Molded-Sheet Drainage Panel: Comply with Section 334600 "Subdrainage."
- B. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 18 gpm per ft. (112 to 220 L/min. per m).
- C. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core, without a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 18 gpm per ft. (112 to 220 L/min. per m).
- D. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panels consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side of the core and a polymeric film bonded to the other side; and with a horizontal flow rate of not less than 2.8 gpm per ft. (35 L/min. per m).
- E. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panels consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side of the core, without a polymeric film bonded to the other side; and with a horizontal flow rate of not less than 2.8 gpm per ft. (35 L/min. per m).
- F. Molded-Sheet Collector-Panel System: Composite subsurface collector-panel system by same manufacturer as primary molded-sheet drainage panels; consisting of a high-profile, studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.425-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 15 gpm per ft. (112 to 188 L/min. per m). Provide system with manufacturer's outlets, connectors, tapes, and other accessories to connect primary molded-sheet drainage panels with piped subdrainage system specified in Section 334600 "Subdrainage."
- G. Molded-Sheet Collector-Panel System: Composite subsurface collector-panel system by same manufacturer as primary molded-sheet drainage panels; consisting of a high-profile, studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.425-mm) sieve laminated to one side of the core, without a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 15 gpm per ft. (112 to 188 L/min. per m). Provide system with manufacturer's outlets, connectors, tapes, and other accessories to connect primary molded-sheet drainage panels with piped subdrainage system specified in Section 334600 "Subdrainage."

2.9 INSULATION

- A. Insulation, General: Comply with Section 072100 "Thermal Insulation."
- B. Board Insulation: Extruded-polystyrene board insulation according to ASTM C 578, square edged.

1. Type IV, 25-psi (173-kPa) minimum compressive strength.
2. Type VI, 40-psi (276-kPa) minimum compressive strength.
3. Type VII, 60-psi (414-kPa) minimum compressive strength.
4. Type V, 100-psi (690-kPa) minimum compressive strength.

2.10 INSULATION DRAINAGE PANELS

- A. Insulation Drainage Panels, General: Comply with Section 072100 "Thermal Insulation."
- B. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.
- C. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.
- D. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.
- E. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.
- F. Unfaced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplapped or channel edges and with one side having ribbed drainage channels.
- G. Unfaced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; unfaced; fabricated with shiplapped or channel edges and with one side having ribbed drainage channels.
- H. Geotextile-Faced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; fabricated with tongue-and-groove edges, with one side having grooved drainage channels, and faced with manufacturer's standard, nonwoven-geotextile filter fabric.
- I. Geotextile-Faced, Plaza-Deck, Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; fabricated with tongue-and-groove edges, with one side having grooved drainage channels, and faced with manufacturer's standard, nonwoven-geotextile filter fabric.

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 concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after 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 waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.
 1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.
- E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

- A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471.
- B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471]. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
 1. Comply with ASTM C 1193 for joint-sealant installation.
 2. Apply bond breaker on sealant surface, beneath preparation strip.
 3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches (150 mm) wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

- B. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.
1. Extend sheet flashings for 4 inches (100 mm) onto perpendicular surfaces and items penetrating substrate.

3.5 WATERPROOFING APPLICATION

- A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471.
- B. Start installing waterproofing in presence of manufacturer's technical representative.
- C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.
- D. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.
 1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a dry film thickness of 60 mils (1.5 mm).
 2. Apply waterproofing to prepared wall terminations and vertical surfaces.
 3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).
- E. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.
 1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of 70 mils (1.8 mm).
 2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
 3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).
- F. Cure waterproofing, taking care to prevent contamination and damage during application and curing.
- G. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
 1. For horizontal applications, install protection course loose laid over fully cured membrane.
 2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.
 3. Molded-sheet drainage panels or Insulation drainage panels may be used in place of a separate protection course for vertical applications when approved in writing by waterproofing manufacturer.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does

not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install board insulation before installing drainage panels.
- B. Molded-Sheet Collector-Panel System: Install according to manufacturer's written instructions. Connect to piped subdrainage system specified in Section 334600 "Subdrainage."

3.7 INSULATION INSTALLATION

- A. Install one or more layers of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.
- B. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions.
- C. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.8 INSULATION DRAINAGE PANEL INSTALLATION

- A. Install drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.
- B. Ensure that drainage channels are aligned and free of obstructions.
- C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.
- D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.9 PLAZA-DECK PAVER INSTALLATION

- A. Install pavers according to manufacturer's written instructions.
- B. Install fixed-height paver pedestals to elevations required. Adjust for final level and slope of paved surface.
 1. Fill paver pedestal with concrete mix, strike smooth with top of pedestal, and cure according to ACI 301.
- C. Loosely lay pavers on pedestals, maintaining a uniform open joint width. Tightly seat pavers against spacers to eliminate lateral movement or drift of paving assembly. Align joint patterns parallel in each direction.
 1. Lay out pavers to avoid less-than-half-width pavers at perimeter or other terminations.
- D. Install pavers to vary no more than 1/16 inch (1.6 mm) in elevation between adjacent pavers and no more than 1/16 inch (1.6 mm) from surface plane elevation of individual paver.

- E. Limit variation in paving installation to within 1/4 inch in 10 feet (6 mm in 3 m) of surface plane in any direction; noncumulative.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections:
1. Testing agency shall verify thickness of waterproofing during application for each 600 sq. ft. (56 sq. m) of installed waterproofing or part thereof.
 2. Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D 5957, after completing waterproofing but before overlaying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - a. Flood to an average depth of 2-1/2 inches (64 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of sheet flashings.
 - b. Flood each area for 24 hours.
 - c. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.
 3. Electronic Leak-Detection Testing:
 - a. Testing agency shall test each deck area for leaks using an electronic leak-detection method that locates discontinuities in the waterproofing membrane.
 - b. Testing agency shall perform tests on abutting or overlapping smaller areas as necessary to cover entire test area.
 - c. Testing agency shall create a conductive electronic field over the area of waterproofing to be tested and electronically determine locations of discontinuities or leaks, if any, in the waterproofing.
 - d. Testing agency shall provide survey report indicating locations of discontinuities, if any.
- B. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components and to furnish daily reports to Architect.
- C. If test results or inspections show waterproofing does not comply with requirements, remove and replace or repair the waterproofing as recommended in writing by manufacturer, and make further repairs after retesting and inspecting until waterproofing installation passes.
- D. Prepare test and inspection reports.

3.11 PROTECTION

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed board insulation or insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

10/31/2024
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City of Long Beach
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Including Locker Room / Bathroom Upgrade
1 West Chester Street, Long Beach, NY 11561
Ai-Alt File No. 23148.00

- D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 21 00

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. Molded polystyrene foam-plastic board.
3. Polyisocyanurate foam-plastic board.
4. Glass-fiber blanket.
5. Glass-fiber board.
6. Mineral-wool blanket.
7. Mineral-wool board.
8. Loose-fill insulation.
9. Spray-applied cellulosic insulation.
10. Cellular glass.
11. Reflective insulations.

- B. Related Requirements:

1. Section 042000 "Unit Masonry" for insulation installed in masonry cells.
2. Section 061600 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
3. Section 071326 "Self-Adhering Sheet Waterproofing", Section 071353 "Elastomeric Sheet Waterproofing", Section 071354 "Thermoplastic Sheet Waterproofing", Section 071413 "Hot Fluid-Applied Rubberized Asphalt Waterproofing", Section 071416 "Cold Fluid-Applied Waterproofing" for insulated drainage panels installed with plaza deck insulation.
4. Section 072119 "Foamed-in-Place Insulation" for spray-applied polyurethane foam insulation.
5. Section 092300 "Gypsum Plastering", Section 092400 "Portland Cement Plastering", Section 092613 "Gypsum Veneer Plastering", Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

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: ASTM C 578, Type X, 15-psi (104-kPa) 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.
 2. Basis of Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- C. Extruded Polystyrene Board: ASTM C 578, Type IV, 25-psi (173-kPa) 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Corporation.
 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

- D. Extruded Polystyrene Board: ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
- E. Extruded Polystyrene Board: ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Corporation.
 - e. Soprema, Inc.
- F. Extruded Polystyrene Board: ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Corporation.
- G. Extruded Polystyrene Board: ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.

- H. Extruded Polystyrene Board: ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
- I. Extruded Polystyrene Board: ASTM C 578, Type V, 100-psi (690-kPa) minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Dow Chemical Company (The).
 - b. Owens Corning.

2.2 MOLDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Molded Polystyrene Board: ASTM C 578, Type I, 10-psi (69-kPa) minimum compressive strength.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.
 - b. DiversiFoam Products.
 - c. Insulfoam LLC; a Carlisle company.
 - d. Plymouth Foam, Inc.
- B. Molded Polystyrene Board: ASTM C 578, Type VIII, 13-psi (90-kPa) minimum compressive strength.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.
 - b. DiversiFoam Products.
 - c. Plymouth Foam, Inc.
- C. Molded Polystyrene Board: ASTM C 578, Type II, 15-psi (104-kPa) minimum compressive strength.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.

- b. DiversiFoam Products.
- c. Insulfoam LLC; a Carlisle company.
- d. Plymouth Foam, Inc.

D. Molded Polystyrene Board: ASTM C 578, Type IX, 25-psi (173-kPa) minimum compressive strength.

- 1. Manufacturers: Subject to compliance with requirements.
- 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.
 - b. DiversiFoam Products.
 - c. Insulfoam LLC; a Carlisle company.
 - d. Plymouth Foam, Inc.

E. Molded Polystyrene Board: ASTM C 578, Type XIV, 40-psi (276-kPa) minimum compressive strength.

- 1. Manufacturers: Subject to compliance with requirements.
- 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.
 - b. Insulfoam LLC; a Carlisle company.
 - c. Plymouth Foam, Inc.

F. Molded Polystyrene Board: ASTM C 578, Type XV, 60-psi (414-kPa) minimum compressive strength.

- 1. Manufacturers: Subject to compliance with requirements.
- 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. ACH Foam Technologies, LLC.
 - b. Insulfoam LLC; a Carlisle company.
 - c. Plymouth Foam, Inc.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyisocyanurate Board: ASTM C 1289, foil faced, Type I, Class 1 or 2.

- 1. Manufacturers: Subject to compliance with requirements.
- 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Atlas Roofing Corporation.
 - b. Dow Chemical Company (The).
 - c. Hunter Panels.
 - d. Rmax, Inc.
- 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

B. Polyisocyanurate Board: ASTM C 1289, glass-fiber-mat faced, Type II, Class 2.

1. Manufacturers: Subject to compliance with requirements.
2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Hunter Panels.
3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket: 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Owens Corning.
- B. Glass-Fiber Blanket, Polypropylene-Scrim-Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).
 1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
- C. 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Owens Corning.
- D. Glass-Fiber Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Owens Corning.
- E. Glass-Fiber Blanket, Foil Faced: ASTM C 665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Owens Corning.

2.5 GLASS-FIBER BOARD

- A. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion characteristics. Nominal density of 2.25 lb/cu. ft (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
- B. Glass-Fiber Board, Faced: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 2.25 lb/cu. ft. (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.

- C. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion characteristics. Nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
- D. Glass-Fiber Board, Faced: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
- E. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion characteristics. Nominal density of 4.25 lb/cu. ft. (68 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Knauf Insulation.
- F. Glass-Fiber Board, Faced: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 4.25 lb/cu. ft. (68 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Knauf Insulation.
- G. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion

characteristics. Nominal density of 6 lb/cu. ft. (96 kg/cu. m), thermal resistivity of 4.4 deg F x h x sq. ft./Btu x in. at 75 deg F (30.5 K x m/W at 24 deg C).

1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
- H. Glass-Fiber Board, Faced: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 6 lb/cu. ft. (96 kg/cu. m), thermal resistivity of not less than 4.34 deg F x h x sq. ft./Btu x in. at 75 deg F (30.1 K x m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.

2.6 MINERAL-WOOL BLANKETS

- A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC (IIG-LLC).
 - b. Roxul Inc.
 - c. Thermafiber Inc.; an Owens Corning company.
- B. Mineral-Wool Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less per ASTM E 84); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Thermafiber, Inc.; an Owens Corning company.

2.7 MINERAL-WOOL BOARD

- A. Mineral-Wool Board, Types IA and IB, Unfaced: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).

1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Roxul Inc.
 - c. Thermafiber, Inc.; an Owens Corning company.
- B. Mineral-Wool Board, Types IA and IB, Faced: ASTM C 612, Types IA and IB; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Thermafiber, Inc.; an Owens Corning company.
- C. Mineral-Wool Board, Type II, Unfaced: ASTM C 612, Type II; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 6 lb/cu. ft. (96 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Roxul Inc.
 - c. Thermafiber, Inc.; an Owens Corning company.
- D. Mineral-Wool Board, Type II, Faced: ASTM C 612, Type II; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 6 lb/cu. ft. (96 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Thermafiber, Inc.; an Owens Corning company.
- E. Mineral-Wool Board, Type III: ASTM C 612, Type III; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 8 lb/cu. ft. (128 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Roxul Inc.
 - c. Thermafiber, Inc.; an Owens Corning company.

- F. Mineral-Wool Board, Type III, Faced: ASTM C 612, Type III; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 8 lb/cu. ft. (128 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Industrial Insulation Group, LLC.
 - b. Roxul Inc.
 - c. Thermafiber, Inc.; an Owens Corning company.

2.8 LOOSE-FILL INSULATION

- A. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Central Fiber LLC.
 - b. GreenFiber.
 - c. Hamilton Manufacturing Inc.
 - d. Nu-Wool Co., Inc.
- B. Glass-Fiber Loose-Fill Insulation: ASTM C 764, Type I for pneumatic application or Type II for poured application; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.

2.9 SPRAY-APPLIED CELLULOSIC INSULATION

- A. Self-Supported, Spray-Applied Cellulosic Insulation: ASTM C 1149, Type I materials applied with liquid adhesive; suitable for either exposed or enclosed applications, Type II (materials containing a dry adhesive activated by water during installation; intended only for enclosed or covered applications, Type III (materials containing an adhesive mixed with water during application; intended for application on attic floors, chemically treated for flame-resistance, processing, and handling characteristics.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Central Fiber LLC.
 - b. GreenFiber.
 - c. Hamilton Manufacturing Inc.

- d. International Cellulose Corp.
- e. Nu-Wool Co., Inc.

2.10 CELLULAR GLASS

- A. Cellular Glass: ASTM C 552, Type I flat block, Type IV board faced on both sides with manufacturer's special kraft-paper sheets laminated to glass block with asphalt.
 - 1. Manufacturers: Subject to compliance with requirements.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Pittsburgh Corning Corporation.

2.11 REFLECTIVE INSULATIONS

- A. Reflective Insulation: ASTM C 1224, with one or more low-emittance surfaces with emittance value of 0.1 or less as measured per ASTM C 1371.
 - 1. Manufacturers: Subject to compliance with requirements.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Fi-Foil Company.
 - b. Innovative Energy, Inc.
 - c. Innovative Insulation, Inc.
 - d. Insulation Solutions, Inc.
 - e. Reflectix, Inc.
 - f. TVM Building Products.
- 3. Construction: Surfaces separated with internal expanders, Surfaces separated by single-layer polyethylene bubble film, Surfaces separated by double-layer polyethylene bubble film].
- 4. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 25 and 50, 25 and 450, respectively.
- 5. Water-Vapor Transmission: 1 perm, maximum; 5 perms or greater.
- B. Sheet Radiant Barrier: ASTM C 1313/C 1313M with at least one surface with emittance value of 0.1 or less as measured per ASTM C 1371.
 - 1. Manufacturers: Subject to compliance with requirements.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Fi-Foil Company.
 - b. Innovative Energy, Inc.
 - c. Innovative Insulation, Inc.
 - d. Insulation Solutions, Inc.
 - e. Reflectix, Inc.
 - f. TVM Building Products.
- 3. Construction: Foil on one side of substrate, Foil on both sides of substrate, Vacuum metallizing on substrate.

4. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 5 and 10, respectively.
 5. Tear Resistance:
 6. Water-Vapor Transmission: 1 perm, maximum; 5 perms or greater
 7. Sheet Width:
- C. Interior Radiation Control Coating System: Silver-colored, low-emissivity, solvent, water-based coating; with a surface emittance value of 0.25 or less as measured per ASTM C 1371.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. SOLEC Corporation.
 - b. STS Coatings, Inc.

2.12 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. AGM Industries, Inc.
 - b. Gemco.
 3. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 4. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Gemco.
 3. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
 4. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Manufacturers: Subject to compliance with requirements.

2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. AGM Industries, Inc.
 - b. Gemco.
 3. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch (25 mm), 2 inches (50 mm), 3 inches (76 mm) between face of insulation and substrate to which anchor is attached.
1. Manufacturers: Subject to compliance with requirements.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. Gemco.
- E. 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.
 2. Basis-of-Design Product: Subject to compliance with requirements, or comparable product by one of the following:
 - a. AGM Industries, Inc.
 - b. Gemco.

2.13 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
 2. 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.
- B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
- C. Asphalt Coating for Cellular-Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by manufacturer of cellular-glass block insulation.
- D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

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 SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm), 36 inches (915 mm) below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm), 36 inches (915 mm) in from exterior walls.

3.4 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.

- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."
- B. Cellular-Glass Board Insulation: Install with closely fitting joints using adhesive pad or serrated trowel attachment method according to manufacturer's written instructions.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
 7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings and seal each continuous area of insulation to ensure airtight installation.
 - a. Exterior Walls: Set units with facing placed toward exterior of construction or interior of construction.
 - b. Interior Walls: Set units with facing placed toward areas of high humidity.

- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

- C. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
 - 1. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."
- D. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

- A. Install board insulation in curtain-wall construction according to curtain-wall manufacturer's written instructions.
 - 1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
 - 2. Install insulation to fit snugly without bowing.

3.8 INSTALLATION OF REFLECTIVE INSULATION

- A. Install sheet reflective insulation according to ASTM C 727.
- B. Install sheet radiant barriers according to ASTM C 1744.
- C. Install interior radiation control coating system according to ASTM C 1321.

3.9 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

SECTION 07 26 00

VAPOR RETARDERS

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. Polyethylene vapor retarders.
2. Reinforced-polyethylene vapor retarders.
3. Fire-retardant, reinforced-polyethylene vapor retarders.

- B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.
2. Section 072100 "Thermal Insulation" for vapor retarders integral with insulation products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- (0.15-mm-) or 10-mil- (0.25-mm-) thick sheet, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

2.2 REINFORCED-POLYETHYLENE VAPOR RETARDERS

- A. Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft. (9 kg/100 sq. m), with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

2.3 FIRE-RETARDANT, REINFORCED-POLYETHYLENE VAPOR RETARDERS

- A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester

scrim and weighing not less than 20 lb/1000 sq. ft. (9 kg/100 sq. m), with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

1. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 200 respectively, per ASTM E 84.

2.4 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.2 INSTALLATION OF VAPOR RETARDERS ON FRAMING

- A. Place vapor retarders on side of construction indicated on Drawings.
- B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.3 INSTALLATION OF VAPOR RETARDERS IN CRAWL SPACES

- A. Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches (305 mm) and seal with manufacturer's recommended tape. Install second layer over pathways to equipment.
- B. Extend vapor retarder over footings and seal to foundation wall or grade beam with manufacturer's recommended tape.
 1. Extend vapor retarder vertically minimum 16 inches (406 mm) above top of footing.

- C. Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

3.4 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION

SECTION 07 27 29

AIR-BARRIER COATINGS

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 vapor-retarding and vapor-permeable air-barrier coatings.
- 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 building paper, flexible flashing and building wraps with air-barrier properties.

1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.
 - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

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 of products.
- B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Include details of interfaces with other materials that form part of air barrier.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air 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.

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. (14 sq. m), 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-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
 - b. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air 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.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.
- B. Mockup Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
 1. Qualitative Air-Leakage Testing: Mockups will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers or ASTM E 1186, chamber depressurization with detection liquids.

2. Quantitative Air-Leakage Testing: Mockups will be tested for air leakage according to ASTM E 783
3. Adhesion Testing: Mockups will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. (207 kPa) according to ASTM D 4541.
4. Notify Architect seven days in advance of the dates and times when mockups will be tested.

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 barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding and permeable air barrier. Air-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 Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 283, ASTM E 783 or ASTM E 2357.

2.3 VAPOR-RETARDING, AIR-BARRIER COATING

- A. Vapor-Retarding, Air-Barrier Coating: Synthetic polymer membrane.

1. Physical and Performance Properties:

- a. Air Permeance: Maximum [0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
 - b. Vapor Permeance: Maximum 0.1 perm (5.8 ng/Pa x s x sq. m); ASTM E 96/E 96M.
 - c. Ultimate Elongation: Minimum 140 percent; ASTM D 412, Die C.

2.4 VAPOR-PERMEABLE, AIR-BARRIER COATING

- A. Vapor-Permeable, Air-Barrier Coating: Synthetic polymer membrane.

1. Physical and Performance Properties:

- a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
- b. Vapor Permeance: Minimum 5.7 perms (327 ng/Pa x s x sq. m); ASTM E 96/E 96M.
- c. Ultimate Elongation: Minimum [500] <Insert number> percent; ASTM D 412, Die C.
- d. Fire Propagation Characteristics: Passes NFPA 285 testing in approved assemblies.

2.5 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by air-barrier material manufacturer.
- C. Butyl Strip: Vapor retarding, 30 to 40 mils (0.76 to 1.0 mm) thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- D. Joint Reinforcing Fabric: Air-barrier manufacturer's nonwoven, reinforcement fabric.
- E. Joint Reinforcing Strip: Air-barrier manufacturer's self-adhering glass-fiber-mesh tape.
- F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- H. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch (0.5 mm) or 0.0250 inch (0.64 mm) thick, and Series 300 stainless-steel fasteners.
- I. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- J. Modified Bituminous Transition Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.
- K. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil- (1.3- to 1.6-mm-) thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners or aluminum termination bars and stainless-steel fasteners.
- L. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
- M. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 079200 "Joint Sealants."

- N. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

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 concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 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, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air 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 membrane.
- 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.

3.3 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches (75 mm) along each side of joints and cracks.

Apply a double thickness of air-barrier coating material and embed joint reinforcing in preparation coat.

- B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of air-barrier coating material at joints. Tape joints with joint reinforcing after first layer is dry. Apply a second layer of air-barrier coating material over joint reinforcing.

3.4 TRANSITION STRIP INSTALLATION

- A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 2. Install modified bituminous transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier coating material on same day. Reprime areas exposed for more than 24 hours.
1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air-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.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply modified bituminous transition strip or elastomeric flashing sheet so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.
1. Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.
 2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches (150 mm) o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.
 3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

- H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- 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 (150 mm) beyond repaired areas in strip direction.

3.5 AIR-BARRIER COATING INSTALLATION

- A. General: Apply air-barrier coating to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply air-barrier coating within manufacturer's recommended application temperature ranges.
 - 1. Apply primer to substrates at required rate and allow it to dry.
 - 2. Limit priming to areas that will be covered by air-barrier coating on same day. Reprime areas exposed for more than 24 hours.
 - 3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- B. Air-Barrier Coatings: Apply a continuous unbroken air-barrier coating to substrates according to the following thickness. Apply an increased thickness of air-barrier coating in full contact around protrusions such as masonry ties.
 - 1. Vapor-Retarding, Air-Barrier Coating: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements.
 - 2. Vapor-Permeable, Air-Barrier Coating: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements.
 - 3. Apply additional coats as needed to achieve void- and pinhole-free surface.
- C. Apply strip and transition strip a minimum of 1 inch (25 mm) onto cured air-barrier material or strip and transition strip over cured air-barrier material overlapping 3 inches (75 mm) onto each surface according to air-barrier manufacturer's written instructions.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements.
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air-barrier system has been provided.

3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 4. Site conditions for application temperature and dryness of substrates have been maintained.
 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 6. Surfaces have been primed, if applicable.
 7. 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.
 8. Termination mastic has been applied on cut edges.
 9. Strips and transition strips have been firmly adhered to substrate.
 10. Compatible materials have been used.
 11. Transitions at changes in direction and structural support at gaps have been provided.
 12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 13. All penetrations have been sealed.
- C. Tests: As determined by Owner's testing agency from among the following tests:
1. Qualitative Air-Leakage Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, smoke pencil with pressurization or depressurization, ASTM E 1186, chamber pressurization or depressurization with smoke tracers, ASTM E 1186, chamber depressurization using detection liquids.
 2. Quantitative Air-Leakage Testing: Air-barrier assemblies will be tested for air leakage according to ASTM E 783.
 3. Adhesion Testing: Air-barrier assemblies will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. (207 kPa) according to ASTM D 4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.
- D. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-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.
- E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.7 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 or 60 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

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END OF SECTION

SECTION 07 84 13

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.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 1. Uniform General Conditions for Construction Contracts, State of Texas, 2010 (UGC).
 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction.

1.2 SUMMARY

- A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

- B. Related Sections:

1. Section 07 84 46 "Fire-Resistive Joint Systems" for joints in or between fire-resistance- rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. LEED Submittals (Project s authorized for LEED certification only):

1. Product Data for Credit IEQ 4.1: For penetration firestopping sealants and sealant primers, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For penetration firestopping sealants and sealant primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small- Scale Environmental Chambers."

- C. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's

illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire- resistance-rated assembly.

1.4 INFORMATION SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 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."
- B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."
- D. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

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. A/D Fire Protection Systems Inc.
 2. Grace Construction Products.
 3. Hilti, Inc.
 4. Nelson Firestop Products.
 5. NUCO Inc.
 6. RectorSeal Corporation.
 7. Specified Technologies Inc.
 8. 3M Fire Protection Products.
 9. Tremco, Inc.; Tremco Fire Protection Systems Group.
 10. USG Corporation.
 11. Substitutions: See Section 01 25 00 – Substitution Procedures.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. 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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

- J. **Silicone Sealants:** Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of non-sag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping 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:** Clean out openings immediately before installing penetration firestopping 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.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. **Priming:** Prime substrates were 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.
- C. **Masking Tape:** Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping 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 fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. 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.
- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping 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 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 is 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 and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING 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 ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO'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."

END OF SECTION

SECTION 08 11 13

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 hollow-metal work.

- B. Related Requirements:

1. Section 081119 "Stainless-Steel Doors and Frames" for hollow-metal doors and frames manufactured from stainless steel.
2. Section 083463 "Detention Doors and Frames" for hollow-metal doors and frames for detention facilities.
3. Section 083473.13 "Metal Sound Control Door Assemblies" for packaged, acoustical hollow-metal door and frame assemblies with STC ratings of 35 or more.
4. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
5. Section 134900 "Radiation Protection" for lead-lined, hollow-metal doors and frames.

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.

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, fire-resistance ratings, 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 anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).
2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches (305 by 305 mm), 8 by 10 inches (203 by 254 mm) to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

E. Schedule: Provide a schedule of hollow-metal work 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.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work 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 work vertically under cover at Project site with head up. Place on minimum 4-inch-(102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

- B. Standard-Duty Doors and Frames: SDI A250.8, Level 1 at locations indicated in the Door Schedule

1. Physical Performance: Level C according to SDI A250.4.
2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches (44.5 mm)
- c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.032 inch (0.8 mm).
- d. Edge Construction: Model 1, Full Flush
- e. Core: Kraft-paper honeycomb or Polystyrene

3. Frames:

- a. Materials: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
- b. Construction: Slip-on drywall

4. Exposed Finish: Prime

- C. Hollow-Metal Doors and Frames: NAAMM-HMMA 860 at locations indicated in the Door Schedule

1. Physical Performance: Level A according to SDI A250.4.

2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches (44.5 mm.)
- c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.032 inch (0.8 mm).
- d. Edge Construction: Continuously welded with no visible seam.
- e. Core: Steel stiffened.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for frames that receive hollow-metal doors; minimum thickness of 0.042 inch ((1.0 mm))for frames that receive hollow-core wood doors.
- b. Materials: Metallic-coated steel sheet, minimum thickness of [0.042 inch (1.0 mm)] [0.053 inch (1.3 mm)].
- c. Construction: Slip-on drywall

4. Exposed Finish: Prime.

D. Commercial Doors and Frames: NAAMM-HMMA 861 at locations indicated in the Door Schedule.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches (44.5 mm.)
- c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
- d. Edge Construction: Continuously welded with no visible seam.
- e. Core: Steel stiffened.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for door openings 48 inches (1219 mm) or less; minimum thickness of 0.067 inch (1.7 mm) for door openings greater than 48 inches (1219 mm).
- b. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm) or 0.067 inch (1.7 mm)
- c. Construction: Face or Full profile welded.

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Hollow-Metal Doors and Frames: NAAMM-HMMA 860 at locations indicated in the Door Schedule.
 1. Physical Performance: Level A according to SDI A250.4.
 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.

- b. Thickness: 1-3/4 inches (44.5 mm.)
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042-inch (1.0 mm), with minimum G60 ((Z180) or A60 (ZF180) coating.
 - d. Edge Construction: Continuously welded with no visible seam.
 - e. Core: Steel stiffened.
- 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than [2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W)] when tested according to ASTM C 1363.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053-inch (1.3 mm), with minimum G60 ((Z180) or A60 (ZF180) coating.
- b. Construction: Face or Full profile welded

4. Exposed Finish: Prime.

C. Commercial Doors and Frames: NAAMM-HMMA 861 at locations indicated in the Door Schedule.

- 1. Physical Performance: Level A according to SDI A250.4.
- 2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches (44.5 mm.)
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053-inch (1.30 mm), with minimum G60 ((Z180) or A60 (ZF180) coating.
- d. Edge Construction: Continuously welded with no visible seam.
- e. Core: Steel stiffened.

- 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than [2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W)] when tested according to ASTM C 1363.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067-inch (1.7 mm), with minimum G60 ((Z180) or A60 (ZF180) coating.
- b. Construction: Face or Full profile welded.

4. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Hollow-metal frames of metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm) or 0.042 inch (1.0 mm).
- B. Construction: Face or Full profile welded

2.6 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
 - 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 4. Post installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.8 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. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) 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.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. 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.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. 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.
- I. Glazing: Comply with requirements in Section 088000 "Glazing."

- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.9 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch (0.66 mm), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches (152 mm) apart. Spot weld to face sheets no more than 5 inches (127 mm) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
 2. Fire Door Cores: As required to provide fire-protection[and temperature-rise] ratings indicated.
 3. Vertical Edges for Single-Acting Doors: [Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm)] Provide beveled or square edges at manufacturer's discretion.
 4. Top Edge Closures: Close top edges of doors with flush closures or inverted closures, except provide flush closures at exterior doors of same material as face sheets.
 5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 7. 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 (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.

- 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 - c. Compression Type: Not less than two anchors in each frame.
 - d. Post installed Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
 6. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
 7. 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.
 8. Terminated Stops: Terminate stops 6 inches (152 mm) above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; 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 applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 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.
 4. Provide loose stops and moldings on inside of hollow-metal work.
 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.10 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.
- B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range

2.11 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
 - 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 - 2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
 - 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

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 roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and 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. Metal-Stud Partitions: 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.
 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 6. 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.
 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: [3/4 inch (19.1 mm)] [5/8 inch (15.8 mm)] plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 56 59

SERVICE AND TELLER WINDOW UNITS

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. Polyethylene Service window units within concrete masonry partitions or framed partitions at locations indicated on Drawings.
2. Teller window units within concrete masonry partitions or framed partitions at locations indicated on Drawings.

- B. Related Requirements:

1. Section 08 33 13, Coiling Counter Doors: Opening Protection in Fire Rated or Smoke Partitions.
2. Section 08 80 00, Glazing: Bullet Resisting Glazing.
3. Section 11 17 36, Package Transfer Units: Package Transfers.
4. Section 28 16 00, Intrusion Detection System: Intrusion Alarm.

1.3 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, Shop Drawings, Product Data, and Samples.

- B. Submittal Drawings: Service windows, showing design, construction and installation.

1. Indicate size, configuration, and fabrication and installation details.
2. Indicate bullet resistant reinforcing for metal components.

- C. Manufacturer's Literature and Data: Service windows.

1. Description of each product.

- D. Sustainable Construction Submittals:

1. Recycled Content: Identify post-consumer and pre consumer recycled content percentage by weight.

- E. Test reports: Report bullet resistance level.

- F. Certificates: Certify products comply with specified bullet resistance rating.

1.4 WARRANTY

- A. Construction Warranty: FAR clause 52.246 21, "Warranty of Construction.".

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Service Window Units: Factory fabricated, assembled, and glazed unit; bullet resistant type.
1. Frame: Stainless steel with integral counter, oversized deal tray, and jamb openings to permit voice communication through window.
- B. Pharmacy Oversized Deal Tray: Permit passage of package measuring 38 by 75 by 375 mm (1 1/2 by 3 by 15 inches).
- C. Other Deal Trays: Manufacturer's standard complying with specified UL 752 bullet resistance level.
- D. Glass: Bullet resistive assembly specified in Section 08 80 00 Glazing.
- E. Teller Window Units: Factory fabricated, assembled, and glazed unit; bullet resistant type.
- F. Frame: Stainless steel with integral counter, deal tray, and jamb openings to permit voice communication through window.
- G. Glass: Bullet resistive assembly specified in Section 08 80 00 Glazing.

2.2 SYSTEM PERFORMANCE

- A. Design service and teller window units complying with specified performance:
1. Bullet Resistance: UL 752; Level 3, minimum.
a. Exception: Pharmacy deal tray.
- B. Forced Entry Resistance: ASTM F1233; Threat Class 1 using basic hand tools.

2.3 MATERIALS

- A. Stainless Steel: ASTM A240/A240M; Type 304, 3 mm (0.12 inch) thick, minimum.

2.4 PRODUCTS - GENERAL

- A. Sustainable Construction Requirements:
1. Stainless Steel Recycled Content: 70 percent total recycled content, minimum.

2.5 FABRICATION

- A. Form stainless steel fabrications to sizes, profiles, and configurations indicated on Drawings.

- B. Frames: Stainless steel.
 - 1. Provide clamp on frames at existing partitions.
 - 2. Jambs and Heads: Continuous with integral glazing stop on corridor side of window unit.
 - 3. Removable Glazing Stops: Applied to room side of window unit.
 - a. Miter and weld removable stops at corners.
 - b. Secure removable stops to frames with countersunk screws, spaced as required for specified performance requirements.
 - 4. Voice Communication: Frame profile and jamb spacers or manufacturer provided compliant openings to provide two way natural voice communication.
- C. Frame Anchors: Stainless steel; masonry and framed partition type, compatible with partition construction.
 - 1. Provide minimum three frame anchors for each jamb.
- D. Sill: Stainless steel.
 - 1. Fabricate sill full opening width to receive both jambs.
 - 2. Fabricate sill with extended writing shelf on both sides of window unit.
- E. Deal Tray: Stainless steel.
 - 1. Incorporate deal tray into sill, without visible seams.
- F. Glazing:
 - 1. Glazing Channel: Stainless steel; configuration as required to accommodate glass installation, and expansion and contraction.
 - 2. Secure glazing channel to window unit frame.
 - 3. Factory glaze window unit.

2.6 FINISHES

- A. Stainless Steel: NAAMM AMP 500; No. 4 polished finish.
- B. Blend welds to match adjacent finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
 - 1. Verify opening is correctly sized and located.
 - 2. Verify partition is prepared to receive frame anchors.
- B. Protect existing construction and completed work from damage.

3.2 INSTALLATION

- A. Install products according to manufacturer's instructions and approved submittal drawings.
- B. Install service and teller window units according to manufacturer's installation instructions.
- C. Set units accurately, plumb, and level.
- D. Securely anchor to masonry or partition framing as shown on submittal drawings to withstand ballistic and forced entry forces.
 - 1. Coordinate with coiling counter door installation in fire rated partition specified in Section 08 33 13, Coiling Counter Doors.
- E. Coordinate with window intrusion detection system specified in Section 28 16 00, Intrusion Detection System.

3.3 CLEANING

- A. Clean exposed window unit surfaces. Remove temporary labels, contaminants, and stains.
- B. Polish stainless steel surfaces for uniform appearance.

3.4 PROTECTION

- A. Protect window units from construction operations.
- B. Remove protective materials immediately before acceptance.
- C. Repair damage.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

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.
 - b. Sliding doors.
 - c. Folding doors.
2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

- B. Related Sections:

1. Section 064113 "Wood-Veneer-Faced Architectural Cabinets"
2. Section 081113 "Hollow Metal Doors and Frames"
3. Section 081119 "Stainless-Steel Doors and Frames"
4. Section 081216 "Aluminum Frames" for door silencers provided as part of aluminum frames.
5. Section 081416 "Flush Wood Doors" provided as part of labeled fire-rated assemblies.
6. Section 081433 "Stile and Rail Wood Doors" provided as part of labeled fire-rated assemblies.
7. Section 083113 "Access Doors and Frames" for access door hardware.
8. Section 083323 "Overhead Coiling Doors" for door hardware provided as part of overhead door assemblies.
9. Section 083326 "Overhead Coiling Grilles" for door hardware provided as part of overhead grille assemblies.
10. Section 083463 "Detention Doors and Frames" for door silencers provided as part of detention frames.
11. Section 083473.13 "Metal Sound Control Door Assemblies" and Section 083473.16 "Wood Sound Control Door Assemblies" for hinges and gasketing provided as part of sound-rated door assemblies.
12. Section 084113 "Aluminum-Framed Entrances and Storefronts"
13. Section 084126 "All-Glass Entrances and Storefronts"
14. Section 084229.13 "Folding Automatic Entrances"
15. Section 084229.23 "Sliding Automatic Entrances"
16. Section 084229.33 "Swinging Automatic Entrances"
17. Section 084243 "Intensive Care Unit/Critical Care Unit (ICU/CCU) Entrances"
18. Section 087163 "Detention Door Hardware" for hardware for detention doors.
19. Section 102213 "Wire Mesh Partitions" for door hardware for doors in wire mesh partitions.

20. Section 102600 "Wall and Door Protection" for plastic door protection units that match wall protection units.
21. Section 133419 "Metal Building Systems" for door hardware,
22. Section 134900 "Radiation Protection" for lead-lined astragals provided as part of labeled fire-rated assemblies.
23. Section 281300 "Access Control" for access control devices installed at door openings and provided as part of a security system.
24. Section 281600 "Intrusion Detection" for detection devices installed at door openings and provided as part of an intrusion-detection system.
25. Section 283111 "Digital, Addressable Fire-Alarm System" for connections to building fire-alarm system.
26. Section 283112 "Zoned (DC Loop) Fire-Alarm System" for connections to building fire-alarm system.

1.3 DOOR HARDWARE ALLOWANCE

- A. Furnish door hardware as part of Door Hardware Allowance.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.
 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Samples for Initial Selection: For plastic protective trim units in each finish, color, and texture required for each type of trim unit indicated.
- D. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
 1. Sample Size: Full-size units or minimum 2-by-4-inch (51-by-102-mm) Samples for sheet and 4-inch (102-mm) long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- E. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. 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.
 - b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
 - c. Format: Use same scheduling sequence and format as in the Contract Documents.
 - d. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For electrified door hardware, from the manufacturer.
 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

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.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with 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 schedules.
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 follows:

1. For door hardware, an Architectural Hardware Consultant (AHC)

- C. Source Limitations: Obtain each type of door hardware from a 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.

- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies 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 or UL 10C, unless otherwise indicated.

- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet 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. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.

- F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

- G. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

- H. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design for door hardware on doors in an accessible route.

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 (22.2 N).

2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. 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 (13 mm) high.
 4. Closers: Adjust door and gate closer sweep periods so that, from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.
 5. Spring Hinges: Adjust door and gate spring hinges so that, from an open position of 70 degrees, the time required to move the door to the closed position is 1.5 seconds minimum.
- I. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." In addition to Owner, Construction Manager, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 2. Preliminary key system schematic diagram.
 3. Requirements for key control system.
 4. Requirements for access control.
 5. Address for delivery of keys.
- J. 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. Inspect and discuss preparatory work performed by other trades.
 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 4. Review sequence of operation for each type of electrified door hardware.
 5. Review required testing, inspecting, and certifying procedures.
- 1.9 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 to Owner by registered mail or overnight package service.

1.10 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory 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'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.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which 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.
 - a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: Five years from date of Substantial Completion.

1.12 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.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or products equivalent in function and comparable in quality to named products.
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using 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 Part 3 "Door Hardware Schedule" Article.
 - 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1

2.3 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: BHMA A156.1

2.4 CENTER-HUNG AND OFFSET PIVOTS

- A. Center-Hung and Offset Pivots: BHMA A156.4

2.5 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); 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.

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. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.

2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- D. Lock Trim:
1. Description: Manufacturer's design designation.
 2. Levers: Wrought or Forged
 3. Knobs: Wrought or Forged
 4. Escutcheons (Roses): Wrought or Forged
 5. Dummy Trim: Match lever or knob lock trim and escutcheons.
 6. Operating Device: Lever or knob with escutcheons (roses).
- 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. Bored Locks: BHMA A156.2; Grade 1 Series 4000.
- G. Mortise Locks: BHMA A156.13; stamped steel case with steel or brass parts; Series 1000.
- H. Interconnected Locks: BHMA A156.12; Grade 1 Series 5000.
- I. Roller Latches: BHMA A156.16; Grade 1; rolling plunger that engages socket or catch, with adjustable roller projection.
- J. Push-Pull Latches: with paddle handles that retract latchbolt; capable of being mounted vertically or horizontally.

2.7 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: BHMA A156.5: Grade 1; with strike that suits frame.
- B. Mortise Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.
- C. Narrow Stile Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.
- D. Push-Button Combination Locks: BHMA A156.5; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.

2.8 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

2.9 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.
- B. Delayed-Egress Electromagnetic Locks: BHMA A156.24, electrically powered, with electromagnet attached to frame and armature plate attached to door; depressing push bar for more than 3 seconds initiates irreversible alarm and 15-second delay for egress. When integrated with fire alarm, fire alarm voids 15-second delay.

2.10 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade 1; motor or solenoid driven; with strike that suits frame.

2.11 SELF-CONTAINED ELECTRONIC LOCKS

- A. Self-Contained Electronic Locks: BHMA A156.25, bored or mortise; with internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism, and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case, and strike that suits frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.

2.12 EXIT LOCKS AND EXIT ALARMS

- A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

2.13 SURFACE BOLTS

- A. Surface Bolts: BHMA A156.16.

2.14 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

2.15 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

2.16 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

2.17 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 1. Manufacturer: Same manufacturer as for locking devices.

- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are removable; face finished to match lockset.
- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type M, mechanical or E, electrical]; permanent cores that are removable; face finished to match lockset.
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.18 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 - 1. No Master Key System: Only change keys operate cylinder.
 - 2. Master Key System: Change keys and a master key operate cylinders.
 - 3. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 - 4. Great-Grand Master Key System: Change keys, a master key, a grand master key, and a great-grand master key operate cylinders.
 - 5. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - b. Re-key Owner's existing master key system into new keying system.
 - 6. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver or Brass.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
 - c. Grand Master Keys: Five.
 - d. Great-Grand Master Keys: Five.

2.19 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 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. Multiple-Drawer Cabinet: Cabinet with drawers equipped with key-holding panels and key envelope storage, and progressive-type ball-bearing suspension slides. Include single cylinder lock to lock all drawers.
 2. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
 3. Portable Cabinet: Tray for mounting in file cabinet, equipped with key-holding panels, envelopes, and cross-index system.
- B. Key Lock Boxes: Designed for storage of two keys with tamper switches to connect to intrusion detection system.
- C. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook.
- D. Key Control System Software: BHMA A156.5, Grade 1; multiple-index system for recording and reporting key-holder listings, tracking keys and lock and key history, and printing receipts for transactions. Include instruction manual.

2.20 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; aluminum or stainless steel, unless otherwise indicated.

2.21 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.
- B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Astragals: BHMA A156.22.

2.22 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 recommendations 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.

2.23 CONCEALED CLOSERS

- A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written recommendations 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.

2.24 CLOSER HOLDER RELEASE DEVICES

- A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by smoke detection system or loss of power.

2.25 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum.

2.26 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single or floor-mounted electromagnet single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.

2.27 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

2.28 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

2.29 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.30 SLIDING DOOR HARDWARE

- A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.31 FOLDING DOOR HARDWARE

- A. General: BHMA A156.14; complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.32 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick aluminum or stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

2.33 PLASTIC PROTECTION PLATES

- A. Plastic Protection Plates: BHMA A156.6; fabricated with four sides beveled; plastic laminate; 1/8 inch (3.2 mm) thick; NEMA LD 3, Grade HGS.

2.34 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.

2.35 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-rated 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
 - 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. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.36 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.
- 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 DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

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 WDHS.3, "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. 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 (750

mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- E. 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.
- F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- I. 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.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is 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. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- 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 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Section 017900 "Demonstration and Training."

END OF SECTION

SECTION 08 80 00

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
2. Glazing sealants and accessories.

- B. Related Requirements:

1. Section 057300 "Decorative Metal Railings" for glazing in railings.
2. Section 084126 "All-Glass Entrances and Storefronts."
3. Section 084233 "Revolving Door Entrances" for glass in revolving door entrances.
4. Section 084423 "Structural-Sealant-Glazed Curtain Walls" for glazing sealants used in structural-sealant-glazed curtain walls.
5. Section 088113 "Decorative Glass Glazing."
6. Section 088300 "Mirrors."
7. Section 088813 "Fire-Resistant Glazing."
8. Section 088853 "Security Glazing."

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. Glass Samples: For each type of the following products; 12 inches (300 mm) square.
 1. Tinted glass.
 2. Coated glass.
 3. Laminated glass.
 4. Insulating glass.
- C. Glazing Accessory Samples: For sealant and colored spacers, in 12-inch (300-mm) lengths.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. 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 and manufacturers of insulating-glass units with sputter-coated, low-E coatings, glass testing agency and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For 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.
- E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in Section 085413 "Fiberglass Windows", Section 085659 "Service and Teller Window Units" to match glazing systems required for Project, including glazing methods.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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 eight 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 (4.4 deg C).

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. **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.
 2. Obtain reflective-coated glass from single source from single manufacturer.
- B. **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.
 3. **Thickness of Patterned Glass:** Base design of patterned glass on thickness at thinnest part of the glass.

4. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
 5. 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 (25 mm), whichever is less.
 6. 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 enhanced-protection testing requirements in ASTM E 1996 for Wind Zones 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 (9.1 m) of grade.
 2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.
- E. Safety Glazing: Where safety glazing is indicated, 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 laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. 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 (W/sq. m x K).
 5. 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.
 6. 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: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 4. 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. 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: 6 mm
 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. Ultraclear Float Glass: ASTM C 1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent and solar heat gain coefficient of not less than 0.87.
- C. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- D. 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.
- E. 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.
- F. Pyrolytic-Coated, Low-Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.
- G. Ceramic-Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."
- H. Reflective-Coated Vision Glass: ASTM C 1376.
- I. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.
- J. Silicone-Coated Spandrel Glass: ASTM C 1048, Type I, Condition C, Quality-Q3.
- K. Reflective-Coated Spandrel Glass: ASTM C 1376, Kind CS.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.
- B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:
 - 1. Polyvinyl butyral interlayer.
 - 2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
 - 3. Ionomeric polymer interlayer.
 - 4. Cast-in-place and cured-transparent-resin interlayer.
 - 5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

2.6 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 and primary and secondary sealants.
 - 2. Spacer: Manufacturer's standard spacer material and construction.
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 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. Colors of Exposed Glazing Sealants: 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.
- C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
- D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

- E. Glazing Sealant: Acid-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

2.8 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.

2.9 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.

2.10 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 (67 deg C), ambient; 180 deg F (100 deg C)]
- 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 (1270 mm).
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 (3-mm) 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: 6 mm
 - 2. Safety glazing required.

3.9 LAMINATED GLASS SCHEDULE

- A. Glass Type: Clear laminated glass with two plies of fully tempered float glass.
 - 1. Basis-of-Design Product: Pella Windows, Impervia Fiberglass Picture Window.
 - 2. Minimum Thickness of Each Glass Ply: 3 mm
 - 3. Interlayer Thickness: As indicated
 - 4. Safety glazing required.
- B. Glass Type: Low-E-coated, laminated vision glass with two plies of clear fully tempered float glass.
 - 1. Basis-of-Design Product: Pella Windows, Impervia Fiberglass Picture Window.
 - 2. Minimum Thickness of Each Glass Ply: 3 mm
 - 3. Interlayer Thickness: As indicated
 - 4. Low-E Coating: As per manufacturer's standards
 - 5. U-Factor: 0.38 maximum.
 - 6. Visible Light Transmittance: 50 percent minimum.
 - 7. Solar Heat Gain Coefficient: 0.36 maximum.
 - 8. Safety glazing required.

3.10 INSULATING GLASS SCHEDULE

- A. Glass Type: Low-E-coated, clear insulating glass.
 - 1. Basis-of-Design Product: Pella Windows, Impervia Fiberglass Picture Window
 - 2. Overall Unit Thickness: 1 inch (25 mm)
 - 3. Minimum Thickness of Each Glass Lite: 3 mm
 - 4. Outdoor Lite: Fully tempered float glass.
 - 5. Interspace Content: Argon
 - 6. Indoor Lite: Fully tempered float glass.
 - 7. Low-E Coating: As per manufacturer's standards
 - 8. U-Factor: 0.38 maximum.
 - 9. Visible Light Transmittance: 50 percent minimum.
 - 10. Solar Heat Gain Coefficient: 0.36 maximum.
 - 11. Safety glazing required.

3.11 INSULATING-LAMINATED-GLASS SCHEDULE

- A. Glass Type: Clear insulating laminated glass.
 - 1. Basis-of-Design Product: Pella Windows, Impervia Fiberglass Picture Window.
 - 2. Overall Unit Thickness: 1 inch (25 mm)
 - 3. Minimum Thickness of Outdoor Lite: 3 mm
 - 4. Outdoor Lite: Fully tempered float glass.
 - 5. Interspace Content: Argon.
 - 6. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
 - a. Minimum Thickness of Each Glass Ply: 3 mm
 - b. Interlayer Thickness: As indicated
 - 7. U-Factor: 0.38 maximum.
 - 8. Solar Heat Gain Coefficient: 0.36 maximum.

9. Safety glazing required.
- B. Glass Type: Low-E-coated, clear insulating laminated glass.
 1. Basis-of-Design Product: Pella Windows, Impervia Fiberglass Picture Window
 2. Overall Unit Thickness: 1 inch (25 mm)
 3. Minimum Thickness of Outdoor Lite: 3 mm.
 4. Outdoor Lite: Fully tempered float glass.
 5. Interspace Content: Argon
 6. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
 - a. Minimum Thickness of Each Glass Ply: 3 mm
 - b. Interlayer Thickness: As indicated.
 7. Low-E Coating: As per manufacturer's standards.
 8. U-Factor: 0.38 maximum.
 9. Visible Light Transmittance: 50 percent minimum.
 10. Solar Heat Gain Coefficient: 0.36 maximum.
 11. Safety glazing required.

END OF SECTION

SECTION 09 05 16

SUBSURFACE PREPARATION FOR FLOOR FINISHES

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. Polyethylene This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes removal of existing floor coverings, testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, floor leveling and repair as required.

- B. Related Requirements:

1. Section 079200 "Joint Sealants".
2. Section 096516 "Resilient Sheet Flooring", Section 096519 "Resilient Tile Flooring", Section 096723.20 "Resinous Epoxy Base with Vinyl Chip Broadcast (Res-2)", Section 096723.30 "Resinous Mortar (Epoxy Resin Composition) Flooring", Section 096723.50 "Resinous (Epoxy Terrazzo) Flooring (Res-5)", Section 096723.60 "Resinous (Urethane and Epoxy Mortar) Flooring", Section 096800 "Carpeting", Section 096821 "Athletic Carpeting".

1.3 ACTION SUBMITTALS

- A. Submit in accordance with Section 01 33 23, Shop Drawings, Product Data, and Test Data.

- B. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer

- C. Product Data:

1. Moisture remediation system
2. Underlayment Primer
3. Cementitious Self-Leveling Underlayment
4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)

- D. Test Data:

1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer's technical representative.

1.4 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact and grade seals unbroken.

- B. Store material to prevent damage or contamination.

PART 2 - PRODUCTS

2.1 MOISTURE REMEDIATION COATING

A. System Descriptions:

1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.
- B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.
- C. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:
 1. Liquid applied coating:
 - a. Resin: epoxy.
 - b. Formulation Description: Multiple component high solids.
 - c. Application: Per manufacturer's written installation requirements.
 - d. Thickness: minimum 10 mils
- D. Material Vapor Permeance: Application shall achieve a permeance rating of less than 0.1 perm in accordance with ASTM E96/E96M.
- E. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113 (Amended 02/05/2016)	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	1.9X10 ⁵ psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufacturer's Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

2.2 CEMENTITIOUS SELF-LEVELING UNDERLayment

A. System Descriptions:

1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.

C. System Characteristics:

1. Wearing Surface: smooth
2. Thickness: Per architectural drawings, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.

D. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.

E. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109/C109M.

F. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM C348

G. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, floor coverings in 16 hours, and resinous flooring in 3-7 days.

H. Primer: compatible and as recommended by manufacturer for use over intended substrate

I. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Primer:

- a. Resin: copolymer
- b. Formulation Description: single component ready to use.
- c. Application Method: Squeegee and medium nap roller.
- d. All puddles shall be removed, and material shall be allowed to dry, 1-2 hours at 70F/21C.
- e. Number of Coats: (1) one.

J. Grout Resurfacing Base:

1. Formulation Description: Single component, cementitious self-leveling high-early and high-ultimate strength grout.

2. Application Method: colloidal mix pump, cam rake, spike roll.

- a. Thickness of Coats: Per architectural scope, 1" lifts.
- b. Number of Coats: More than one if needed.

3. Aggregates: for applications greater than 1inch, require additional 3/8" aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM C109/C109M	2,200 psi @ 24 hrs 3,000 psi @ 7 days
Initial set time	ASTM C191	30-45 min.
Final Set time		1 to 1.5 hours
Bond Strength	ASTM D7234	100% bond to concrete failure

2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLayment (NOT SUITABLE FOR RESINOUS FLOOR FINISHES)

- A. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
- B. Compressive Strength: Minimum 4000 psi in 28 days
- C. Trowel-applied underlayment shall not contain silica quartz (sand).
- D. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before testing and not less than three days after testing.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.
- C. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

3.2 SURFACE PREPARATION

- A. Existing concrete slabs with existing floor coverings:
 1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
 2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RCFI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.
- B. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents shall be used.

- C. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.
- D. Prepare concrete substrates per ASTM D4259 as follows:
 - 1. Dry abrasive blasting.
 - 2. Wet abrasive blasting.
 - 3. Vacuum-assisted abrasive blasting.
 - 4. Centrifugal-shot abrasive blasting.
 - 5. Comply with manufacturer's written instructions.
- E. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
- F. Verify that concrete substrates are dry.
- G. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufacturer's formal and project specific written recommendation.
- H. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity per flooring manufacturer's formal and project specific written recommendation.
- I. Provide a written report showing test placement and results.
- J. Prepare joints in accordance with Section 07 92 00, JOINT SEALANTS and material manufacturer's instructions.
- K. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer's technical representative.
- L. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not exceed 1/4" deviation in 10'. As required, install underlayment to achieve required tolerance.
- M. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

3.3 MOISTURE REMEDIATION COATING

- A. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.
- B. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM D4259.
- C. Mix and apply moisture remediation coating in accordance with manufacturer's instructions.

3.4 CEMENTITIOUS UNDERLayment

- A. Install cementitious self-leveling underlayment as required to correct surface defects, floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings, address non-moving cracks or joints, provide a smooth surface for the installation of floor covering, or meet elevation requirements detailed on drawings.
- B. Mix and apply in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, tempered hardwood, or other suitable protection course.

3.6 FIELD QUALITY CONTROL

- A. Where specified, field sampling of products shall be conducted by a qualified, independent testing facility.

END OF SECTION

SECTION 09 22 16

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.

- B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

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."

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 or 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft. (239 Pa) or 10 lbf/sq. ft. (480 Pa)].

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 (Z120) or ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.
1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
 - b. Depth: 3-5/8 inches (92 mm)
 2. Embossed Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
 - b. Depth: 3-5/8 inches (92 mm)
- C. Slip-Type Head Joints: Where indicated, provide the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to runners while allowing 1-1/2-inch (38-mm) minimum vertical movement.
 2. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) 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 (305 mm) of the top of studs to provide lateral bracing.
 3. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 4. 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.
- 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.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm)
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 1-1/2 inches (38 mm)
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm)
 2. Depth: 7/8 inch (22.2 mm)

- H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 3/4 inch (19 mm)
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. 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/E 488M conducted by a qualified testing agency.
 - 2. 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.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 2-1/2 inches (64 mm)
- F. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm)
 - b. Depth: 1-5/8 inches (41 mm)
 - 3. Embossed Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0147 inch (0.373 mm)
 - b. Depth: 1-5/8 inches (41 mm)

4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
 5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

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 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 (3.2 mm) 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.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials

below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Single-Layer Application: As required by horizontal deflection performance requirements.
 2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
 3. Tile Backing Panels: As required by horizontal deflection performance requirements 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 (13-mm) 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 (150 mm) o.c.
- E. Direct Furring:
1. Screw to wood framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) 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 (1219 mm) o.c.
 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 3. Furring Channels (Furring Members): 16 inches (406 mm) 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 attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. 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 (3 mm in 3.6 m) lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 23 00

GYPSUM PLASTERING

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. Gypsum plastering on expanded-metal lath.
2. Gypsum plastering on unit masonry.
3. Gypsum plastering on monolithic concrete.

- B. Related Requirements:

1. Section 092613 "Gypsum Veneer Plastering" for gypsum-based veneer plaster applied on gypsum base for veneer plaster, unit masonry, and monolithic concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for each substrate and finish texture indicated for gypsum plastering, including accessories.
 - a. Size: 100 sq. ft. (9 sq. m) in surface area.
2. Simulate finished lighting conditions for review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, moisture, direct sunlight, contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 842 requirements or gypsum plaster manufacturer's written recommendations, whichever are more stringent.
- B. Room Temperatures: Maintain temperatures at not less than 55 deg F (13 deg C) or greater than 80 deg F (27 deg C) for at least seven days before application of gypsum plaster, continuously during application, and for seven days after plaster has set or until plaster has dried.
- C. Avoid conditions that result in gypsum plaster drying out too quickly.
 1. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
 2. Maintain relative humidity levels for prevailing ambient temperature that produce normal drying conditions.
 3. Ventilate building spaces in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Where indicated, provide gypsum plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.
- B. Sound-Transmission Characteristics: Where indicated, provide gypsum plaster assemblies identical to those of assemblies tested for STC ratings according to ASTM E 90 and classified according to ASTM E 413 by a qualified testing agency.

2.2 EXPANDED-METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.
 1. Paper Backing: Kraft paper factory bonded to back of lath.
 2. Diamond-Mesh Lath:
 - a. Type: Flat or Self-furring.
 - b. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m) or 3.4 lb/sq. yd. (1.8 kg/sq. m).
 3. Flat-Rib Lath: Rib depth of not more than 1/8 inch (3 mm), 2.75 lb/sq. yd. (1.5 kg/sq. m) or 3.4 lb/sq. yd. (1.8 kg/sq. m).
 4. 3/8-Inch (10-mm) Rib Lath: 3.4 lb/sq. yd. (1.8 kg/sq. m) or 4 lb/sq. yd. (2.2 kg/sq. m).

2.3 ACCESSORIES

- A. General: Comply with ASTM C 841, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

1. Cornerite: Fabricated from expanded-metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.
2. Striplath: Fabricated from expanded-metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.
3. Cornerbeads: Fabricated from zinc or zinc-coated (galvanized) steel.
 - a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
 - b. Smallnose cornerbead with perforated flanges; use on curved corners.
 - c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
 - d. Bullnose cornerbead, radius 3/4-inch (19-mm) minimum, with expanded flanges; use at locations indicated on Drawings.
4. Casing Beads: Fabricated from zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
5. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
6. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
7. Two-Piece Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch (6 to 16 mm) wide; with perforated flanges.

C. Plastic Accessories: Manufactured from high-impact PVC.

1. Cornerbeads: With perforated flanges.
 - a. Smallnose cornerbead; use unless otherwise indicated.
 - b. Bullnose cornerbead, radius 3/4-inch (19-mm) minimum; use at locations indicated on Drawings.
2. Casing Beads: With perforated flanges in depth required to suit plaster bases indicated and flange length required to suit applications indicated.
 - a. Square-edge style; use unless otherwise indicated.
 - b. Bullnose style, radius 3/4-inch (19-mm) minimum; use at locations indicated on Drawings.
3. Control Joints: One-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
4. Expansion Joints: Two-piece type, formed to produce slip-joint and square-edged 1/2-inch- (13-mm-), 1-inch- (25-mm-) or 1-1/2-inch- (38-mm-) wide reveal; with perforated concealed flanges.

D. Aluminum Trim: Extruded accessories of profiles and dimensions indicated on Drawings.

1. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
2. Finish: Mill or Chemical-conversion coating, ASTM D 1730, Type B, compatible with field-applied finish coatings specified

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Bonding Compound: ASTM C 631.
- C. Fasteners for Attaching Metal Lath to Substrates: ASTM C 841.
- D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.
- E. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing), produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of rated assembly.
- F. Mix Additives: Use gypsum plaster accelerators and retarders from plaster manufacturer if required by Project conditions. Use only additives that manufacturer recommends in writing for use with plaster to which it is added.

2.5 BASE-COAT PLASTER MATERIALS

- A. Lightweight-Gypsum Ready-Mixed Plaster: ASTM C 28/C 28M, with mill-mixed perlite aggregate.
- B. Gypsum Neat Plaster: ASTM C 28/C 28M, for use with job-mixed aggregates.
- C. Gypsum Wood-Fibered Plaster: ASTM C 28/C 28M, for use as is or with the addition of job-mixed sand in up to equal proportions by weight.
- D. High-Strength Gypsum Neat Plaster: ASTM C 28/C 28M, with a minimum, average, dry compressive strength of 2800 psi (19 MPa) according to ASTM C 472 for a mix of 100 lb (45 kg) of plaster and 2 cu. ft. (0.06 cu. m) of sand.
- E. Aggregates for Base-Coat Plasters: ASTM C 35, sand and perlite.

2.6 FINISH-COAT PLASTER MATERIALS

- A. Gypsum Gaging Plaster: ASTM C 28/C 28M.
- B. Gypsum Ready-Mixed Finish Plaster: Manufacturer's standard, mill-mixed, gaged, interior finish.
- C. High-Strength Gypsum Gaging Plaster: ASTM C 28/C 28M, with a minimum, average, dry compressive strength of 5000 psi (34 MPa) according to ASTM C 472 for a neat mix.
- D. Gypsum Keene's Cement: ASTM C 61/C 61M.
- E. Lime: ASTM C 206, Type S, special finishing hydrated lime.
- F. Lime: ASTM C 206, Type N, normal finishing hydrated lime.

- G. Aggregates for Float Finishes: ASTM C 35, sand, perlite; graded according to ASTM C 842.

2.7 PLASTER MIXES

- A. Mixing: Comply with ASTM C 842 and manufacturer's written instructions for applications indicated.
- B. Mix Additives: Use accelerators and retarders, if required by Project conditions, according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, 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. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- B. STC-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- C. Sound-Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.
- D. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.

3.4 INSTALLING EXPANDED-METAL LATH

- A. Expanded-Metal Lath: Install according to ASTM C 841.
 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.
 3. Curved-Ceiling Framing: Install flat-diamond-mesh lath.
 4. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.
 5. Solid-Plaster Partitions: Where supported by channel studs and L-runners, install flat-diamond-mesh lath.
 6. Studless Solid-Plaster Partitions: Where supported by L-runners, install 3/8-inch (10-mm) rib lath.

3.5 INSTALLING ACCESSORIES

- A. General: Install according to ASTM C 841.
- B. Cornerbeads: Install at external corners.
- C. Casing Beads: Install at terminations of plasterwork, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.
- D. Control Joints: Locate as approved by Architect for visual effect, with spacing between joints in either direction not exceeding the following:
 1. Partitions: 30 feet (9 m).
 2. Ceilings: 30 feet (9 m).
- E. Aluminum Trim: Install according to manufacturer's written instructions.

3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 842.
 1. Do not deviate more than plus or minus 1/8 inch in 10 feet (3 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10-foot (3-m) straightedge placed on surface.
 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry substrates for direct application of plaster.
- C. Base-Coat Plaster:
 1. Over Expanded-Metal Lath:
 - a. Scratch Coat: Gypsum neat plaster with job-mixed sand
 - b. Brown Coat: Lightweight-gypsum ready-mixed plaster
 2. Over Unit Masonry: Lightweight-gypsum ready-mixed plaster
 3. Over Monolithic Concrete: Gypsum neat plaster with job-mixed sand.
- D. Finish Coats:
 1. Smooth-Troweled Finishes:
 - a. Materials: Gypsum gaging plaster and lime putty or Gypsum ready-mixed finish plaster
 - b. Locations: Provide smooth-troweled finish unless otherwise indicated.
 2. Float Finishes:

- a. Materials: Gypsum gaging plaster and lime putty or Gypsum Keene's cement and lime putty
 - b. Locations: Provide float finish where indicated.
3. Sprayed Finishes: Match Architect's sample
- a. Materials: Gypsum ready-mixed finish plaster
 - b. Locations: Provide sprayed finish where indicated.
4. Textured Finishes: Match Architect's sample
- a. Materials: Gypsum ready-mixed finish plaster
 - b. Locations: Provide textured finish where indicated.
- E. Concealed Plaster:
- 1. Where plaster application is concealed behind built-in cabinets, similar furnishings, and equipment, apply finish coat.
 - 2. Where plaster application is concealed above suspended ceilings and in similar locations, omit finish coat.
 - 3. Where plaster application is used as a base for adhesive application of tile and similar finishes, omit finish coat.

3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 24 00

CEMENT PLASTERING

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 vertical plasterwork (stucco).
2. Exterior horizontal and nonvertical plasterwork (stucco).
3. Interior vertical plasterwork.
4. Interior horizontal and nonvertical plasterwork.

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. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples: For each type of factory-prepared finish coat and for each color and texture specified.
- D. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.
- E. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
 - a. Size: 100 sq. ft. (9 sq. m) in surface area.

2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.7 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.

- B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

- C. Interior Plasterwork: Maintain room temperatures at greater than 40 deg F (4.4 deg C) for at least 48 hours before plaster application, and continuously during and after application.

1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

- D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

2.2 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.

1. Diamond-Mesh Lath: Flat or Self-furring, 2.5 lb/sq. yd. (1.4 kg/sq. m) or 3.4 lb/sq. yd. (1.8 kg/sq. m).

2. Flat-Rib Lath: Rib depth of not more than 1/8 inch (3 mm), 2.75 lb/sq. yd. (1.5 kg/sq. m) or 3.4 lb/sq. yd. (1.8 kg/sq. m).
3. 3/8-Inch (10-mm) Rib Lath: 3.4 lb/sq. yd. (1.8 kg/sq. m) or 4 lb/sq. yd. (2.2 kg/sq. m).

B. Wire-Fabric Lath:

1. Welded-Wire Lath: ASTM C 933; self-furring, 1.4 lb/sq. yd. (0.8 kg/sq. m) or 1.95 lb/sq. yd. (1.1 kg/sq. m).
2. Woven-Wire Lath: ASTM C 1032; self-furring, with stiffener wire backing, 1.4 lb/sq. yd. (0.8 kg/sq. m).

C. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper or Grade B, Style 1a vapor-retardant paper].

1. Provide paper-backed lath unless otherwise indicated.

2.3 ACCESSORIES

A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

1. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 (Z180) zinc coating.
2. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.
3. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized-zinc coating.
4. Cornerbeads: Fabricated from zinc or zinc-coated (galvanized) steel.
 - a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
 - b. Smallnose cornerbead with perforated flanges; use on curved corners.
 - c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
 - d. Bullnose cornerbead, radius 3/4 inch (19 mm) minimum, with expanded flanges; use at locations indicated on Drawings.
5. Casing Beads: Fabricated zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
6. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
7. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
8. Two-Piece Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch (6 to 16 mm) wide; with perforated flanges.

C. Plastic Accessories: Manufactured from high-impact PVC.

1. Cornerbeads: With perforated flanges.

- a. Smallnose cornerbead; use unless otherwise indicated.
- b. Bullnose cornerbead, radius 3/4-inch (19-mm) minimum; use at locations indicated on Drawings.
- 2. Casing Beads: With perforated flanges in depth required to suit plaster bases indicated and flange length required to suit applications indicated.
 - a. Square-edge style; use unless otherwise indicated.
 - b. Bullnose style, radius 3/4-inch (19-mm) minimum; use at locations indicated on Drawings.
- 3. Control Joints: One-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
- 4. Expansion Joints: Two-piece type, formed to produce slip-joint and square-edged 1/2-inch- (13-mm-), 1-inch- (25-mm-) or 1-1/2-inch- (38-mm-) wide reveal; with perforated concealed flanges.

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
- E. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.
- F. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2.5 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
 - 1. Color for Finish Coats: White
- B. Masonry Cement: ASTM C 91, Type N.
 - 1. Color for Finish Coats: White
- C. Plastic Cement: ASTM C 1328.
- D. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color to match Architect's sample
- E. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

- F. Sand Aggregate: ASTM C 897.
 - 1. Color for Job-Mixed Finish Coats: In color matching Architect's sample
- G. Perlite Aggregate: ASTM C 35.
- H. Exposed Aggregates for Finish Coats: For marblecrete finish, clean, sound, crushed marble matching color and size gradation of Architect's sample
- I. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Color: As selected by Architect from manufacturer's full range
- J. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.
 - 1. Color: As selected by Architect from manufacturer's full range

2.6 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to $\frac{3}{4}$ or 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to $\frac{3}{4}$ or 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
 - 2. Masonry Cement Mixes:
 - a. Scratch Coat: Mix 1 part masonry cement and 2-1/2 to 4 parts aggregate.
 - b. Brown Coat: Mix 1 part masonry cement and 3 to 5 parts aggregate, but not less than volume of aggregate used in scratch coat.
 - 3. Portland and Masonry Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 1 part masonry cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

4. Plastic Cement Mixes:
 - a. Scratch Coat: Mix 1 part plastic cement and 2-1/2 to 4 parts aggregate.
 - b. Brown Coat: Mix 1 part plastic cement and 3 to 5 parts aggregate, but not less than volume of aggregate used in scratch coat.
5. Portland and Plastic Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Base-Coat Mixes for Use over Unit Masonry and Concrete: Single base (scratch) coat for two-coat plasterwork on low-absorption plaster bases as follows:
 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 2. Portland and Masonry Cement Mix: For cementitious material, mix 1 part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 3. Plastic Cement Mix: Use 1 part plastic cement and 2-1/2 to 4 parts aggregate.
- D. Base-Coat Mixes for Use over Unit Masonry and Concrete: Single base (scratch) coat for two-coat plasterwork on high-absorption plaster bases as follows:
 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 2. Masonry Cement Mix: Use 1 part masonry cement and 2-1/2 to 4 parts aggregate.
 3. Portland and Masonry Cement Mix: For cementitious material, mix 1 part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 4. Plastic Cement Mix: Use 1 part plastic cement and 2-1/2 to 4 parts aggregate.
- E. Job-Mixed Finish-Coat Mixes:
 1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 3/4 to 1-1/2 or 1-1/2 to 2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
 2. Masonry Cement Mix: Use 1 part masonry cement and 1-1/2 to 3 parts aggregate.
 3. Portland and Masonry Cement Mix: For cementitious materials, mix 1 part portland cement and 1 part masonry cement. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
 4. Plastic Cement Mix: Use 1 part plastic cement and 1-1/2 to 3 parts aggregate.
- F. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, 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. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- B. Sound-Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

3.4 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C 1063.
 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.
 3. Curved-Ceiling Framing: Install flat-diamond-mesh lath.
 4. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External (Outside) Corners:
 1. Install lath-type, external-corner reinforcement or cornerbead at exterior locations.
 2. Install cornerbead at interior locations.
- C. Control Joints: Locate as approved by Architect for visual effect and as follows:
 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
 - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).
 2. At distances between control joints of not greater than 18 feet (5.5 m) o.c.
 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 4. Where control joints occur in surface of construction directly behind plaster.
 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet (6 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10-foot (3-m) straightedge placed on surface.
 - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry and concrete substrates for direct application of plaster.
- C. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch (19-mm) total thickness, as follows:
 - 1. Portland cement mixes.
 - 2. Masonry cement mixes.
 - 3. Portland and masonry cement mixes.
 - 4. Plastic cement mixes.
 - 5. Portland and plastic cement mixes.
- D. Ceilings; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork and having 1/2-inch (13-mm) total thickness or 3/4-inch (19-mm) total thickness for metal lath on concrete, as follows:
 - 1. Portland cement mixes.
 - 2. Masonry cement mixes.
 - 3. Portland and masonry cement mixes.
 - 4. Plastic cement mixes.
 - 5. Portland and plastic cement mixes.
- E. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 3/8-inch (10-mm) thickness on masonry or 1/4-inch (6-mm) thickness on concrete, as follows:
 - 1. Portland cement mix.
 - 2. Masonry cement mix.
 - 3. Portland and masonry cement mix.
 - 4. Plastic cement mix.
 - 5. Portland and plastic cement mix.
- F. Ceilings; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 1/4-inch (6-mm) thickness on concrete, as follows:
 - 1. Portland cement mix.
 - 2. Masonry cement mix.
 - 3. Portland and masonry cement mix.
 - 4. Plastic cement mix.
 - 5. Portland and plastic cement mix.
- G. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.

- H. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.
- I. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.
- J. Concealed Interior Plasterwork:
 - 1. Where plaster application is concealed behind built-in cabinets, similar furnishings, and equipment, apply finish coat.
 - 2. Where plaster application is concealed above suspended ceilings and in similar locations, omit finish coat.
 - 3. Where plaster application is used as a base for adhesive application of tile and similar finishes, omit finish coat.

3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

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 gypsum board.
2. Exterior gypsum board for ceilings and soffits.
3. Tile backing panels.
4. Texture finishes.

- B. Related Requirements:

1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
3. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
4. Section 092613 "Gypsum Veneer Plastering" for gypsum base for veneer plaster and for other components of gypsum-veneer-plaster finishes.
5. 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. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

- C. Samples for Initial Selection: For each type of trim accessory and textured finish indicated.

- D. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 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.

1.6 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: For 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 Wallboard: ASTM C 1396/C 1396M.
 - 1. Thickness: 1/2 inch (12.7 mm).
 - 2. Long Edges: Tapered.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.
- C. 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 (6.4 mm).
 - 2. Long Edges: Tapered.
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 1/2 inch (12.7 mm).
 - 2. Long Edges: Tapered.
- E. Foil-Backed Gypsum Board: ASTM C 1396/C 1396M.
 - 1. Core: 5/8 inch (15.9 mm), Type X or Type C as required by fire-resistance-rated assembly indicated on Drawings.
 - 2. Long Edges: Tapered.
- F. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M.
 - 1. Core: 1/2 inch (12.7 mm), regular type or 5/8 inch (15.9 mm), Type X.
 - 2. Surface Abrasion: Meets or exceeds level requirements.
 - 3. Surface Indentation: Meets or exceeds level requirements.
 - 4. Single-Drop Soft-Body Impact: Meets or exceeds level requirements.
 - 5. Long Edges: Tapered.
 - 6. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- G. Impact-Resistant Gypsum Board: ASTM C 1629/C 1629M.
 - 1. Core: 1/2 inch (12.7 mm), regular type or 5/8 inch (15.9 mm), Type X.
 - 2. Surface Abrasion: Meets or exceeds level requirements.
 - 3. Surface Indentation: Meets or exceeds level requirements.
 - 4. Single-Drop Soft-Body Impact: Meets or exceeds level requirements.
 - 5. Hard-Body Impact: Meets or exceeds level requirements according to test in Annex A1.
 - 6. Long Edges: Tapered.
 - 7. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- H. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 1/2 inch (12.7 mm), regular type or 5/8 inch (15.9 mm), Type X.

2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
 1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
 2. Long Edges: Tapered.
- B. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
 1. Core: 5/8 inch (15.9 mm), Type X or 5/8 inch (15.9 mm), abuse resistant.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.
 1. Core: 5/8 inch (15.9 mm), regular type or 5/8 inch (15.9 mm), Type X
 2. Long Edges: Tapered.
- D. Skim-Coated Gypsum Board: ASTM C 1396/C 1396M. Manufactured with a factory-applied skim coat.
 1. Core: 1/2 inch (12.7 mm), regular type or 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.

2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

- A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
 1. Core: 5/8 inch (15.9 mm), Type X.
- B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
 1. Core: 5/8 inch (15.9 mm), Type X.

2.6 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
 1. Core: 1/2 inch (12.7 mm), regular type
 2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
 1. Thickness: 1/2 inch (12.7 mm).

2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
 1. Core: 1/2 inch (12.7 mm), regular type or Type C as required by fire-resistance-rated assembly indicated on Drawings].

2.7 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
 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Exterior Trim: ASTM C 1047.
 1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.
- C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 1. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 2. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified

2.8 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Exterior Gypsum Soffit Board: Paper.
 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 4. 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 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.
 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
 3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.9 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.
 - C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
 - D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 - 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."

- G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

2.10 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Polystyrene Aggregate Ceiling Finish: Water-based, job-mixed, polystyrene aggregate finish with flame-spread and smoke-developed indexes of not more than 25 when tested according to ASTM E 84.
- C. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.
- D. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
- E. Acoustical Finish: Water-based, chemical-setting or drying-type, job-mixed texture finish for spray application.
 - 1. Application Thickness: 1/2 inch (12.7 mm)
 - 2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 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: 50 or less.
 - 3. NRC: 0.55 or according to ASTM C 423.

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 (1.5 mm) 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. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) 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- (6.4- to 12.7-mm-) 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. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. 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.
- K. 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: Vertical surfaces unless otherwise indicated.
 - 2. Type X: Where required for fire-resistance-rated assembly.
 - 3. Flexible Type: Apply in double layer at curved assemblies.
 - 4. Ceiling Type: Ceiling surfaces.
 - 5. Foil-Backed Type: As indicated on Drawings.
 - 6. Abuse-Resistant Type: As indicated on Drawings.
 - 7. Impact-Resistant Type: As indicated on Drawings.
 - 8. Mold-Resistant Type: As indicated on Drawings.
 - 9. Type C: Where required for specific fire-resistance-rated assembly indicated.
 - 10. Glass-Mat Interior Type: As indicated on Drawings.
 - 11. Acoustically Enhanced Type: As indicated on Drawings.
 - 12. Skim-Coated 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 stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. 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 (400 mm) 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. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. 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- (300-mm-) 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 (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 2. Fasten with corrosion-resistant screws.

3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Water-Resistant Backing Board: Install where indicated with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 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.
 - 2. Bullnose Bead: Use where indicated.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. L-Bead: Use where indicated.
 - 5. U-Bead: Use where indicated.
 - 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges.
- E. Aluminum Trim: Install in locations indicated on Drawings.

3.7 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 or Panels that are substrate for acoustical tile.
 3. Level 3: Where indicated on Drawings.
 4. 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."
 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- 3.8 APPLYING TEXTURE FINISHES**
- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
 - B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
 - C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 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

SECTION 09 30 13

CERAMIC/PORCELAIN 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. Quarry tile.
3. Pressed floor tile.
4. Porcelain tile.
5. Glazed wall tile.
6. Stone thresholds.
7. Tile backing panels.
8. Waterproof membrane
9. Crack isolation membrane.
10. Metal edge strips.

- B. Related Requirements:

1. Section 071326 "Self-Adhering Sheet Waterproofing", Section 071353 "Elastomeric Sheet Waterproofing", Section 071354 "Thermoplastic Sheet Waterproofing", Section 071416 "Cold Fluid-Applied Waterproofing" for waterproofing under thickset mortar beds.
2. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Section 092400 "Cement Plastering" for scratch coat for thickset mortar setting-bed installations.
4. Section 092613 "Gypsum Veneer Plastering" for cementitious backer units.
5. Section 092900 "Gypsum Board" for cementitious backer units, water-resistant backer board
6. Section 093023 "Glass Tiling."
7. Section 093033 "Stone Tiling."
8. Section 093500 "Chemical-Resistant Tiling."
9. Section 096340 "Stone Flooring" for stone thresholds.

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. 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.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square or 36 inches (900 mm) square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Stone thresholds in 6-inch (150-mm) lengths.
 - 5. Metal edge strips in 6-inch (150-mm) 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 and certified porcelain tile.

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 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 installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of floor tile installation.
 - 2. Build mockup of wall tile installation.
 - 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 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 aggregate, from single manufacturer.
 - 2. Obtain waterproof 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.
1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type [PRT-01]: Anti-slip Porcelain Floor Tile.
1. Certification: Tile certified by the Porcelain Tile Certification Agency.
 2. Face Size: 8 inches by 47 inches
 3. Face Size Variation: Rectified.
 4. Thickness: 3/8 inch (9.5 mm)
 5. Face: Natural Finish
 6. Dynamic Coefficient of Friction: Not less than 0.50
 7. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range
 8. Grout Color: As selected by Architect from manufacturer's full range
 9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size.
 - b. Wainscot Cap: Surface bullnose, module size.
 - 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.
 - 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 (12.7 to 6.4 mm) across nominal 4-inch (100-mm) dimension.

B. Ceramic Tile Type [PRT-02]: Porcelain Wall Tile

1. Certification: Tile certified by the Porcelain Tile Certification Agency.
 2. Face Size: 32 inches by 32 inches
 3. Face Size Variation: Rectified.
 4. Thickness: 3/8 inch (9.5 mm)
 5. Face: Lappato Finish
 6. Dynamic Coefficient of Friction: Not less than 0.42 Interior, Dry.
 7. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range
 8. Grout Color: As selected by Architect from manufacturer's full range
 9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size.
 - b. Wainscot Cap: Surface bullnose, module size.
 - 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.
 - e. Internal Corners: Field-butted square corners.
- C. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as used for adjoining wall tile.
1. One soap holder with grab handle for each shower and tub indicated.
 2. One paper holder at each water closet.
 3. Color and Finish: As selected by Architect from manufacturer's full range

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 (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.
- B. Granite Thresholds: ASTM C 615/C 615M.
1. Description: Match Architect's sample.
- C. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 10 or 12 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.
1. Description: Match Architect's sample.
- D. Slate Thresholds: ASTM C 629/C 629M.
1. Description: Match Architect's sample.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
- B. Fiber-Cement Backer Board: ASTM C 1288, in maximum lengths available to minimize end-to-end butt joints.

2.6 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. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.
 - 1. Nominal Thickness: 0.030 inch (0.76 mm).
 - 2. Nominal Thickness: 0.040 inch (1 mm).
- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester.
 - 1. Nominal Thickness: 0.025 inch (0.6 mm).
 - 2. Nominal Thickness: 0.040 inch (1 mm).
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
- E. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with fabric reinforcement facing; 0.040-inch (1-mm) nominal thickness.
- F. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
- G. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
- H. Latex-Portland Cement Waterproof Mortar: Flexible, waterproof mortar consisting of cement-based mix and latex additive.
- I. Waterproofing and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both waterproofing and tile-setting adhesive in a two-step process.

2.7 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. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.

- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester; 0.040-inch (1-mm) nominal thickness.
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
- E. Corrugated Polyethylene: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch (4-mm) nominal thickness.
- F. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch (1-mm) nominal thickness.
- G. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
- H. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
- I. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.
- J. Crack Isolation Membrane and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both a crack isolation membrane and tile-setting adhesive in a two-step process.

2.8 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 (0.1 mm) thick.
 - 2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) 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. (1.4 kg/sq. m) or 3.4 lb/sq. yd. (1.8 kg/sq. m).
 - 4. Latex Additive: Manufacturer's standard 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. Dry-Set Portland Cement Mortar (Thinset): ANSI A118.1.
 - 1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- C. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- D. Medium-Bed, Latex-Portland Cement Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch (16 mm)
1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
- E. EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar (Thinset): ANSI A118.11.
1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
- F. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.
- G. Organic Adhesive: ANSI A136.1, Type I.

2.9 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.
- C. High-Performance Tile Grout: ANSI A118.7.
1. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 2. 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
1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.
- E. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlays 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 (0.1 mm) thick.
- C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications.
- 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.
- E. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.11 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 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 (1:50) 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 swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - f. 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. Porcelain Tile: 1/4 inch (6.4 mm) or 3/8 inch (9.5 mm)
- 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 latex-portland cement mortar (thinset).
 2. Do not extend waterproofing membrane under thresholds set in dry-set portland cement or latex-portland cement] mortar. Fill joints between such thresholds and adjoining tile set on waterproofing membrane with elastomeric sealant.
- K. Metal Edge Strips: Install at locations where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- L. Floor Sealer: Apply floor sealer to 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 latex-Portland cement 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.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

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 F116: water-cleanable, tile-setting epoxy.
 - a. Ceramic Tile Type: Porcelain Tile
 - b. Grout: Water-cleanable epoxy grout.
 2. Ceramic Tile Installation: TCNA F122; thinset mortar on waterproof membrane.
 - a. Ceramic Tile Type: Porcelain Tile
 - b. Thinset Mortar: Latex Portland cement mortar.
 - c. Grout: High-performance sanded or unsanded grout.
 3. Ceramic Tile Installation: TCNA F131; water-cleanable, tile-setting epoxy; epoxy grout.
 - a. Ceramic Tile Type: Porcelain Tile
 - b. Grout: Water-cleanable epoxy grout.
- B. Interior Wall Installations, Masonry or Concrete:
 1. Ceramic Tile Installation: TCNA W221 and ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, cement mortar bed (thickset) on metal lath over waterproof membrane.
 - a. Ceramic Tile Type: Porcelain Tile

- b. Bond Coat for Wet-Set Method: Dry-set or Latex-Portland cement mortar.
 - c. Bond Coat for Cured-Bed Method: Dry-set or Latex-Portland cement mortar.
 - d. Grout: High-performance sanded or unsanded grout.
2. Ceramic Tile Installation: TCNA W222 and ANSI A108.1A, ANSI A108.1B, ANSI A108.1C; one-coat cement mortar bed (thickset) on metal lath over waterproof membrane.
- a. Ceramic Tile Type: Porcelain Tile
 - b. Bond Coat for Wet-Set Method: Dry-set or Latex-Portland cement mortar.
 - c. Bond Coat for Cured-Bed Method: Dry-set or Latex-Portland cement mortar.
 - d. Grout: High-performance sanded or unsanded grout.
3. Ceramic Tile Installation: TCNA W223; organic adhesive.
- a. Ceramic Tile Type: Porcelain Tile.
 - b. Grout: High-performance sanded or unsanded grout.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.
- B. Related Requirements:
 - 1. Section 095123 "Acoustical Tile Ceilings" for ceilings consisting of mineral-base acoustical tiles used with concealed suspension systems, stapling, or adhesive bonding.
 - 2. Section 095133 "Acoustical Metal Pan Ceilings."
- C. 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:
- C. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.
- D. Samples for Initial Selection: For components with factory-applied color finishes.
- E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of 6-inch- (150-mm-) square samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- (150-mm-) 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. Suspended ceiling components.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Size and location of initial access modules for acoustical panels.
 - 4. Electrical outlets, switches, and thermostats.
 - 5. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - 6. Perimeter moldings.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- E. 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 that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: 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.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
 - 4. Impact Clips: Equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.

2. 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 acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Comply with ASTM E 1264.
 2. Smoke-Developed Index: 50 or less.
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 PERFORATED GYPSUM BOARD PANELS

- A. Acoustical Panel Type:
 1. Basis of Design: Subject to compliance with project requirements, the design is based on the following: USG Interiors, LLC, "USG Danoline Wall and Ceiling Panels, Perforated Acoustical Gypsum". Suspension System: Obtain each type from single source from single manufacturer.
 2. Panel Edge: 4 sided bevel, no visible joints after finishing.

3. Panel Thickness: 1/2 inch (12.7 mm).
4. Panel Size: 48 by 96 inches (1219 by 2438 mm).
5. Perforation: S9 Square.
6. Perforation Pattern: 2L4 Eights.
7. Percent Open Area: S9 2L4 Square 13.6%
8. NRC: Not less than: <Insert from Usq Data Sheet IC 758>.
9. Color: Manufacturers standard Unpainted -Field Paint

- a. Panel finishing: Fill and sand all screw holes with USG Setting Compound, sand and finish to a smooth & uniform appearance.
- b. Panel Priming: [Spot apply primer as required] [apply one coat of primer with "dry Rolled" technique.]
- c. Finish Paint: Use "Dry Roller Technique" for paint application. Apply [One] [Two] Coats of finish paint <insert designation here> with low nap foam roller. Roll excess paint from brush prior to applying coat of paint. Avoid painting interior of perforations. Do not overload paint roller.

10. Filling of Holes at cut openings in tile: Apply USG Durabond© Setting-Type compound to holes adjacent to openings. Protect areas not to be filled with painting tape. Allow patching compound to dry, sand smooth, apply primer and paint where needed.

2.3 OPTIONAL ADDITIONAL ACOUSTICAL BACKER PANEL

- A. If additional Acoustical performance is required, install optional acoustical panel above factory applied acoustical sheet. Field cut acoustical panels as required for a tight fit to the panel framing members.:
 1. Option 1: Acoustical Backer Panel
 - a. Basis-of-Design Product: USG Corporation; Mars High NRC/ High CAC panels.
 - 1) Acoustical Absorption NRC
 - 2) Edge/Joint Detail: SQ Square.
 - 3) Panel Thickness: 1 inch (25.4 mm).
 - 4) Modular Size: 1'-10" by 3'-8" (560 by 1120 mm).
 - 5) Installation: friction fit in between suspension framing members.
 2. Option 2: Acoustical Board
 - a. Basis-of-Design Product: Knauf Insulation; Acoustical Smooth Board with ECOSE® Technology.
 - 1) Acoustical Absorption: <Insert value Data Sheet IC756>.
 - 2) Edge/Joint Detail: SQ Square.
 - 3) Panel Thickness: 3/4 inch (19 mm)
 - 4) Modular Size: 2'-4' wide by 4'-10' long (610-1500 by 1219-3050 mm).
 - 5) Installation: friction fit in between suspension framing members.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Cast-in-place anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
 - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
 - d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. 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: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-(2.69-mm-) dimension> diameter wire.
- D. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- H. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.
- I. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.

- J. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- K. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including manufacturer's standard gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

2.5 METAL SUSPENSION SYSTEM

A. Drywall Suspension System for Perforated Gypsum Panels

- 1. Basis-of-Design Product: USG Corporation; Drywall Suspension System, main tee (heavy duty).
 - a. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
 - b. Framing Members, General: Comply with ASTM C754 for conditions indicated.
 - c. Protective Coating: ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
 - d. Framing System:
 - 1) Deflection criteria: L/240 in accordance with ASTM C635.
 - 2) Galvanized Steel: G40 double-web tee, hot-dipped galvanized steel.
- 2. Framing Members - Suspension System Main Tees:
 - a. Basis-of-Design Product: USG Corporation; DLGW26 (Heavy Duty, Main Tee), field cut as needed.
- 3. Three Way Off-Module Clip:
 - a. Basis-of-Design Product: USG Corporation; DH3 (quantity (2) per DWSS tee, (10) ten per panel, typical).
- 4. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements, if applicable.
 - a. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - b. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1, zinc coating, soft temper.
 - 1) Size: Minimum 0.108-inch- (2.7-mm-) diameter wire, 12 gauge, in accordance with ASTM C636.

B. Direct Applied system: Z-Channel with slotted or unslotted web.

- 1. Channel Depth: 1 1/2" (38mm).
- 2. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection
- 3. Accessories: Acoustical Insulation Retention Clips: USG Corporation; Retention Clip (1clip per 2-3 feet (600-900mm) of Z Channel, on-center, refer to USG IC-722 for more detailed information. Retain "Narrow-Face, Steel-Capped, Double-Web, Fire-Rated Steel Suspension System"

Paragraph below along with permitted fire-resistance-rated acoustical panel if fire-rated assembly is required for Project.

C. Direct Applied system: Hat-Channel per ASTM C 645

1. Depth: 5/8" (16mm)
2. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 (ASTM B 221M) for Alloy and Temper 6063-T5.
2. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
3. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 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 and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post installed anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to short axis of space.
 - c. Install panels in a basket-weave pattern.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
 7. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.

8. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 1. Compliance of seismic design.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
 1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post installed anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two post installed anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 - b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

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. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Cement board.
3. Clay masonry.
4. Concrete masonry units (CMUs).
5. Steel and iron.
6. Galvanized metal.
7. Aluminum (not anodized or otherwise coated).
8. Copper.
9. Stainless steel.
10. Wood.
11. Fiberglass.
12. Plastic.
13. Gypsum board.
14. Plaster.
15. Acoustic panels and tiles.
16. Spray-textured ceilings.
17. Cotton or canvas insulation covering.
18. ASJ insulation covering.
19. Bituminous-coated surfaces.

B. Related Requirements

1. [Section 051200 "Structural Steel Framing"] [Section 051213 "Architecturally Exposed Structural Steel Framing"] for shop priming structural steel.
2. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
3. Section 055113 "Metal Pan Stairs" for shop priming metal pan stairs.
4. Section 055116 "Metal Floor Plate Stairs" for shop priming metal floor plate stairs.
5. Section 055119 "Metal Grating Stairs" for shop priming metal grating stairs.
6. Section 055213 "Pipe and Tube Railings" for shop [priming] [painting] pipe and tube railings.
7. [Section 055313 "Bar Gratings"] [Section 055316 "Plank Gratings"] [Section 055319 "Expanded Metal Gratings"] for shop priming metal gratings.
8. Section 099600 "High-Performance Coatings" for tile-like coatings.
9. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.02 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.nts
- 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 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.nts
- G. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.nts

1.03 SUBMITTALS

- A. Submit under provisions of Section 01 33 00, Submittal Procedures.
- B. Product Data: Manufacturer's Data sheets on each paint and coating product should include:
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations
 - 3. Primer requirements and finish specifications
 - 4. Storage and handling requirements and recommendations
 - 5. Application methods
 - 6. Clean-up information
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.
- D. Coating Maintenance Manual: upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Paint Maintenance Manual" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.04 MOCK-UP

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

- A. Finish surfaces for verification of products, colors & sheens.
- B. Finish area designated by Architect.
- C. Provide samples that designate prime & finish coats.
- D. Do not proceed with remaining work until the Architect approves the mock-up samples.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:

Product name and type (description)
Application & use instructions
Surface preparation
VOC content
Environmental handling and an SDS
Batch date
Color number

- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- C. Handling: Maintain a clean, dry storage area to prevent contamination or damage to the coatings.

1.06 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer

The Sherwin-Williams Company
101 Prospect Avenue NW
Cleveland, OH 44115
Tel: (800) 321-8194
www.sherwin-williams.com

- B. Substitutions: Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 Product Requirements.
When submitting a request for substitution, provide complete product data specified above under Submittals, for each substitute product.

2.02 SCHEDULE

- A. Concrete – (Walls & Ceilings, Poured, Precast, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place, Plaster)

1. Latex Systems

- a. Semi-Gloss Finish
 - 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
 - 2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
 - 3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
(4 mils wet, 1.7 mils dry per coat)

b. Eggshell/Satin Finish

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate:

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate:

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
(4 mils wet, 1.6 mils dry per coat)

Sanitizing Technology Finish

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†, A87W00001
3rd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†, A87W00001
4 mils wet, 1.7 mils dry per coat)

c. Flat Finish

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series

(4.0 mils wet, 1.4 mils dry per coat)

Alternate:

- 1st Coat: S-W Loxon® Concrete and Masonry Primer, LX02 Series
(8.0 mils wet, 3.2 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Flat, A86-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Flat, A86-60 Series
(4 mils wet, 1.8 mils dry per coat)

B. Masonry – (CMU – Concrete, Split Face, Scored, Smooth, High/ Low Density, Fluted)

1. Latex Systems

a. Semi-Gloss Finish

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
(4 mils wet, 1.7 mils dry per coat)

b. Eggshell/Satin Finish

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate:

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate:

- 1st Coat: S-W ConFlex™ Block Filler, CF01 Series

(75-100 sq ft/gal)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
(4 mils wet, 1.6 mils dry per coat)

Sanitizing Technology Finish

1st Coat: S-W ConFlex™ Block Filler, CF01 Series
(75-100 sq ft/gal)
2nd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†,
A87W00001
3rd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†,
A87W00001
(4 mils wet, 1.7 mils dry per coat)

C. Metal - Ferrous (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Sashes, Doors, Partitions)

1. Latex Systems

a. Eggshell/Satin Finish

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer, B66-1300 Series
(5.0 mils wet, 1.9 mils dry)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate:

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer, B66-1300 Series
(5.0 mils wet, 1.9 mils dry)
2nd Coat: S-W ProClassic® Waterborne Interior Acrylic Satin, B20-1100 Series
3rd Coat: S-W ProClassic® Waterborne Interior Acrylic Satin, B20-1100 Series
(4.0 mils wet, 1.2 mils dry per coat)

Alternate:

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer, B66-1300 Series
(5.0 mils wet, 1.9 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
(4.0 mils wet, 1.7 mils dry per coat)

b. Flat Finish

1st Coat: S-W Pro Industrial™ Pro-Cryl® Universal Primer, B66-1300 Series
(5.0 mils wet, 1.9 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series
(4.0 mils wet, 1.4 mils dry per coat)

D. DRYWALL (Walls, Ceilings, Gypsum Board, Plaster Board, etc.)

1. Latex Systems

a. Semi-gloss Finish

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600

(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Semi-Gloss, B31-1900 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Semi-Gloss, B31-2600 Series
(4.0 mils wet, 1.5 mils dry per coat)

Alternate:

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Semi-Gloss, A88-60 Series
(4 mils wet, 1.7 mils dry per coat)

b. Eggshell/Satin Finish

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
3rd Coat: S-W ProMar® 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Eg-Shel, B20-12600 Series
(4.0 mils wet, 1.7 mils dry per coat)

Alternate

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Satin, A87-60 Series
(4 mils wet, 1.6 mils dry per coat)

Sanitizing Technology Finish

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†, A87W00001
3rd Coat: S-W SuperPaint® Interior Latex Satin with Sanitizing Technology†, A87W00001
(4 mils wet, 1.7 mils dry per coat)

c. Flat Finish

1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600

- (4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series
3rd Coat: S-W ProMar® 200 Zero VOC Latex Flat, B30-12600 Series
(4.0 mils wet, 1.4 mils dry per coat)
- Alternate:
1st Coat: S-W ProMar® 200 Zero VOC Latex Primer, B28W2600
(4.0 mils wet, 1.0 mils dry)
2nd Coat: S-W SuperPaint® Air Purifying Technology* Interior Flat, A86-60 Series
3rd Coat: S-W SuperPaint® Air Purifying Technology* Interior Flat, A86-60 Series
(4 mils wet, 1.8 mils dry per coat)

2.03 MATERIALS – GENERAL REQUIREMENTS

A. Paints and Coatings - General

1. Latex Systems Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such a procedure is specifically described in manufacturer's product instructions. VOCs need to be confirmed by using the products EDS sheets.

B. Primers

1. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.04 ACCESSORIES

A. Coating Application Accessories:

1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly examined and prepared. Notify Architect of unsatisfactory conditions before proceeding.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- D. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead-based paints, notify Architect immediately if lead based paints are encountered.

3.02 SURFACE PREPARATION

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority. Removal must be done in accordance with EPA Renovation, Repair and Painting Rule and all related state and local regulations. Care should be taken to follow all state and local regulations which may be stricter than those set under the federal RRP Rule.

- A. Proper product selection, surface preparation and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.
- B. Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.
- C. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion. Recognize that any surface preparation short of total removal of the old coating may compromise the service length of the system.
- D. Prior to attempting to remove mildew, it is always recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions may be advised. Mildew may be removed before painting by washing with a solution of 1-part liquid bleach and 3-parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- E. Methods
 1. Aluminum
Remove all oil, grease, dirt, oxide, and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
 2. Concrete, SSPC-SP13 or NACE 6
This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
 3. Drywall - Interior
Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.

4. **Galvanized Metal**
Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
5. **Plaster**
Must be allowed to dry thoroughly for at least 30 days before painting unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1-pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
6. **Steel: Structural, Plate, etc.**
Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
7. **Solvent Cleaning, SSPC-SP1**
Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
8. **Hand Tool Cleaning, SSPC-SP2**
Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before Hand Tool Cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
9. **Power Tool Cleaning, SSPC-SP3**
Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before Power Tool Cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
10. **White Metal Blast Cleaning, SSPC-SP5 or NACE 1**
Re A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
11. **Commercial Blast Cleaning, SSPC-SP6 or NACE 3**
A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied

paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

12. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4
A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
13. Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals, SSPC-SP16
This standard covers the requirements for brush-off blast cleaning of uncoated or coated metal surfaces other than carbon steel by the use of abrasives. These requirements include visual verification of the end condition of the surface and materials and procedures necessary to achieve and verify the end condition. A brush-off blast cleaned non-ferrous metal surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, metal oxides (corrosion products), and other foreign matter. Intact, tightly adherent coating is permitted to remain. A coating is considered tightly adherent if it cannot be removed by lifting with a dull putty knife.
14. Power Tool Cleaning to Bare Metal, SSPC-SP11
Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
15. Near-White Blast Cleaning, SSPC-SP10 or NACE 2
A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
16. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials
SSPC-SP WJ-1/NACE WJ-1, Clean to Bare Substrate (WJ-1) is intended to be similar to the degree of surface cleanliness of SSPC-SP 5/NACE 1, except that stains are permitted to remain on the surface. This standard is used when the objective is to remove every trace of rust and other corrosion products, coating, and mill scale.
SP WJ-2/NACE WJ-2, Very Thorough Cleaning (WJ-2) is intended to be similar to the degree of surface cleanliness of SSPC-SP 10/NACE 2, except that tightly adherent material, rather than only stains, is permitted to remain on the surface. This standard is used when the objective is to remove almost all rust and other corrosion products, coating, and mill scale.
SP WJ-3/NACE WJ-3, Thorough Cleaning (WJ-3) is intended to be similar to the degree of surface cleanliness of SSPC-SP 10/NACE 2, except that tightly adherent material, rather than only stains, is permitted to remain on the surface. This standard is used when the objective is to remove much of the rust and other corrosion products, coating, and mil scale, leaving tightly adherent thin films.

SSPC WJ-4/NACE WJ-4, Light Cleaning (WJ-4) is intended to be similar to the degree of surface cleanliness of SSPC-SP 10/NACE 2, except that tightly adherent material, rather than only stains, is permitted to remain on the surface. This standard is used when the objective is to allow as much of the tightly adherent rust and other corrosion products, coating, and mill scale to remain as possible. Discoloration of the surface may be present.

17. Water Blasting, NACE Standard RP-01-72

Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

3.03 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces.
 1. Wait at least 30 days before applying to new concrete or masonry, or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
 2. Test new concrete for moisture content.
 3. Wait until wood is fully dry.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to the application of each coat

3.04 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

SECTION 10 28 00

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. Section Includes: Toilet and bath accessories at dressing rooms, toilets, baths, locker rooms and other areas indicated on drawings.

- B. Related Requirements:

- 1. Section 09 06 00, Schedule for Finishes: Color of finishes.
 - 2. Section 09 30 13, Ceramic/Porcelain Tiling: Ceramic Toilet and Bath Accessories.
 - 3. Section 10 21 23, Cubicle Curtain Tracks: Shower Curtain Break Away Pendant Chain Hooks.

1.3 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, Shop Drawings, Product Data, and Samples.

- B. Submittal Drawings:

- 1. Show size, configuration, and fabrication, anchorage and installation details.
 - 2. Show mounting locations and heights.

- C. Manufacturer's Literature and Data:

- 1. Description of each product.
 - 2. Installation instructions.

- D. Samples:

- 1. Full sized, complete assembly of each product specified.
 - 2. Approved samples may be incorporated into project.

- E. Certificates: Certify each product complies with specifications.

- 1. Soap dispensers: Certify soap dispensers are fabricated of material that will not be affected by liquid soap, aseptic detergents, and hexachlorophene solutions.

- F. Qualifications: Substantiate qualifications comply with specifications.

- 1. Manufacturer.

- G. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.
- 1.4 QUALITY ASSURANCE**
- A. Manufacturer Qualifications:
1. Regularly manufactures specified products.
- 1.5 DELIVERY**
- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.
- 1.6 STORAGE AND HANDLING**
- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage during handling and construction operations.
- 1.7 WARRANTY**
- A. Construction Warranty: FAR clause 52.246 21, "Warranty of Construction."
- PART 2 - PRODUCTS**
- 2.1 MATERIALS**
- A. Aluminum: ASTM B221M (ASTM B221), Alloy 6063 T5 and Alloy 6463 T5.
- B. Stainless Steel:
1. Plate Or Sheet: ASTM A666, Type 304, 0.8 mm (0.031 inch) thick unless otherwise specified.
 2. Tubing: ASTM A269/A269M, Grade TP 304, seamless or welded.
 3. Pipe: ASTM A312/A312M; Grade TP 304.
- C. Steel Sheet: ASTM A653/A653M, zinc coated (galvanized) coating designation G90.
- D. Chrome Plating (Service Condition Number SC 2): ASTM B456.
- E. Brass Castings: ASTM B30.
- F. Copper:
1. Tubing: ASTM B75/B75M.
 2. Castings: ASTM B824.

- G. Glass:
1. ASTM C1036, Type 1, Class 1, Quality q2, for mirrors
- 2.2 PRODUCTS - GENERAL**
- A. Provide each product from one manufacturer.
- 2.3 PAPER TOWEL DISPENSERS**
- A. Surface mounted type with sloping top.
 - B. Dispensing capacity for 300 sheets of any type of paper toweling.
 - C. Fabricate of stainless steel.
 - D. Provide door with continuous hinge at bottom, and spring tension cam lock or tumbler lock, keyed alike, at top, and refill sight slot in front.
- 2.4 WASTE RECEPTACLES**
- A. Semi recessed type, without doors. Fed. Spec. WW P 541, Type II.
 - B. Fabricate of stainless steel.
 - C. Form face frame from one piece.
 - D. Provide removable waste receptacle of approximately 45 L (12 gal.) capacity, fabricated of stainless steel.
 - E. Waste receptacle key locked in place.
- 2.5 TOILET TISSUE DISPENSERS**
- A. Double roll surface mounted type.
 - B. Mount on continuous backplate.
 - C. Removable spindle ABS plastic or chrome plated plastic.
 - D. Wood rollers are not acceptable.
 - E. Toilet Tissue Dispensers Used In Mental Health And Behavioral Patient Care Units: Soft plastic rod incapable of supporting load greater than 22.6 kg (50 pounds) with concealed or tamper resistant fasteners.
- 2.6 GRAB BARS**
- A. Fed. Spec. WW P 541/8B, Type IV, bars, surface mounted, Class 2, grab bars and complying with ASTM F446.

- B. Fabricate from stainless steel or nylon coated steel, use one type throughout project:
1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.
 2. Nylon Coated Steel: Grab bars and flanges complete with mounting plates and fasteners. // Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES. //
- C. Mounting:
1. Floor Mounted Grab Bars: Exposed type.
 2. Swing Up Grab Bars: Exposed type.
 3. Toilet / Shower Partitions Mounted Grab Bars: Exposed type.
 4. Other Types and Locations: Concealed type.
- D. Bars:
1. Fabricate to 38 mm (1 1/2 inch) outside diameter.
 - a. Stainless steel, minimum 1.2 mm (0.05 inch) thick.
 - b. Nylon coated bars, minimum 1.5 mm (0.06 inch) thick.
 2. Fabricate in one continuous piece with ends turned toward walls.
 - a. Swing up grab bars and grab bars continuous around three sides of showers may be fabricated in two sections, with concealed slip joint between.
 3. Continuously weld intermediate support to grab bar.
 4. Swing Up Bars: Manually operated; designed to prevent bar from falling when in raised position.
- E. Flange for Concealed Mounting:
1. Minimum 2.65 mm (0.1 inch) thick, maximum 79 mm (3 1/8 inch) diameter by 13 mm (1/2 inch) deep, with minimum three set screws for securing flange to back plate.
 2. Insert grab bar through center of flange and continuously weld perimeter of grab bar flush to back side of flange.
 3. In lieu of providing flange for concealed mounting, and back plate as specified, grab bar may be welded to back plate covered with flange.
- F. Flange for Exposed Mounting:
1. Minimum 5 mm (3/16 inch) thick, maximum 79 mm (3 1/8 inch) diameter.
 2. Insert grab bar through flange and continuously weld perimeter of grab bar flush to backside of flange.
 3. Where mounted on toilet / shower partitions, provide three equally spaced, countersunk holes, sized to accommodate 5 mm (3/16 inch) diameter bolts.
 4. Where mounted on floor, provide four equally spaced holes, sized to accommodate 5 mm (3/8 inch) diameter bolts, maximum 5 mm (3/8 inch) from edge of flange.
- G. Back Plates:
1. Minimum 2.65 mm (0.1046 inch) thick metal.
 2. Fabricate in one piece, maximum 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.

3. Provide spreaders, through bolt fasteners, and cap nuts, where grab bars are mounted on partitions.
- H. Grab bars in Mental Health and Behavioral Patient Care Units: Provide units complying with accessibility standards, but preventing materials from being threaded between bar and wall as possible anchor point.

2.7 SHOWER CURTAIN RODS

- A. Stainless steel tubing, minimum 1.27 mm (0.050 inch) wall thickness, 32 mm (1 1/4 inch) outside diameter.
- B. Flanges, stainless steel rings, 66 mm (2.6 inch) minimum outside diameter, with 2 holes opposite each other for 6 mm (1/4 inch) stainless steel fastening bolts. Provide set screw within curvature of each flange for securing rod.
- C. Intermediate Support: For rods over 1800 mm (72 inches) long. Provide adjustable ceiling flanges with set screws, tubular hangers and stirrups.
- D. Shower curtain rods in Mental Health and Behavioral Nursing Units:
 1. Chrome plated plastic rods capable of supporting 22.6 kg (50 pounds) before pulling free of wall flanges.
 2. Option: Ceiling mounted hospital cubicle curtain tracks as specified in Section 10 21 23, Cubicle Curtain Tracks, with break away pendant chain hooks. Chain hooks located at 2000 mm (79 inches) above floor.

2.8 TOWEL BARS

- A. Fed. Spec. WW P 541/8B, Type IV, Bar, Surface mounted; Class 1, towel.
- B. Stainless steel, or chromium plated copper alloy.
- C. Bar Length: 450 and 600 mm (18 and 24 inches) as shown.
- D. Finish brackets and supports to match bar.

2.9 METAL FRAMED MIRRORS

- A. Fed. Spec. A 3002 metal frame; // chromium finished steel, // anodized aluminum, // or // stainless steel //.
- B. Mirror Glass:
 1. Minimum 6 mm (1/4 inch) thick.
 2. Set mirror in a protective vinyl glazing tape.
- C. Frames:
 1. Channel or angle shaped section with face of frame minimum 9 mm (3/8 inch) wide. Fabricate with square corners.
 2. Metal Thickness 0.9 mm (0.035 inch).

3. Filler:

- a. Where mirrors are mounted on walls having ceramic tile wainscots not flush with wall above, provide fillers contoured to conceal void between back of mirror and wall surface.
- b. Fabricate fillers from same material and finish as mirror frame.

4. Attached Shelf for Mirrors:

- a. Fabricate shelf of same material and finish as mirror frame.
- b. Make shelf maximum 150 mm (6 inches) in depth, and extend full width of mirror.
- c. Close ends and front edge of shelf to same thickness as mirror frame width.
- d. Form shelf for aluminum framed mirror as integral part of bottom frame member.
- e. Form stainless steel shelf with concealed brackets to attach to mirror frame.

D. Back Plate:

1. Fabricate backplate for concealed wall hanging from zinc coated, or cadmium plated 0.9 mm (0.036 inch) thick sheet steel, die cut to fit face of mirror frame.
2. Provide set screw type theft resistant concealed fastening system for mounting mirrors.

E. Mounting Bracket:

1. Designed to support mirror tight to wall.
2. Designed to retain mirror with concealed set screw fastenings.

2.10 SOAP DISHES

A. Fed. Spec. WW P 541/8B, Type VI, Holder.

B. Class 1, Soap, Surface Mounted:

1. One piece with provisions for exposed fasteners.
2. Fabricate from chromium plated brass approximately 115 by 95 mm (4 1/2 by 3 3/4 inches) overall size with drainage openings at bottom.

C. Soap, Recessed:

1. One piece seamless shell and flange with provisions for concealed fasteners.
2. Fabricate from 0.8 mm (0.031 inch) thick stainless steel or chromium plated brass.
3. Form surface of soap tray with raised ridges or patterned dimples to provide gripping surface for soap bar, or provide flush soap tray with a retaining lip. Plastic soap trays or tray inserts are not acceptable.

2.11 PAPER CUP DISPENSER

A. Fabricate of stainless steel.

B. Provide door with concealed stainless steel pivoting rod or piano hinge, and spring tension cam lock, or tumbler lock, keyed alike when more than one accessory unit is provided, and with cup level refill sight slot in door front.

C. Fabricate for flat bottom cups.

- D. 90 Milliliters (3 ounce) Dispenser Unit:
 - 1. Surface mounted single stack dispenser unit having a capacity of maximum one hundred fifty cups.
 - 2. Form door from one piece to cover front and sides warp free.
- E. 120 Milliliters (4 ounce) Dispenser Unit:
 - 1. Recessed type single stack dispenser unit having a capacity of Maximum one hundred cups.
 - 2. Form face frame in one piece.
 - 3. Fabricate door double pan warp free.
- F. Combination 90 to 180 Milliliters (3 to 6 ounce) Dispenser and Disposal Unit:
 - 1. Recessed type, having a capacity of Maximum 170 cups.
 - 2. Fabricate as twin stack dispenser unit with adjustable dispensing mechanism to dispense any size cup.
 - 3. Fabricate face frames in one piece and doors double pan warp free.
 - 4. Fabricate recessed disposal unit with removable waste receptacle having a capacity of minimum 11 L (3.1 gallons).

2.12 MOP RACKS

- A. Minimum 1016 mm (40 inches) long with five holders.
- B. Clamps:
 - 1. Minimum of 1.3 mm (0.05 inch) thick stainless steel bracket retaining channel with hard rubber serrated cam; pivot mounted to channel.
 - 2. Clamps to hold handles from 13 mm (1/2 inch) minimum to 32 mm (1 1/4 inch) maximum diameter.
- C. Support:
 - 1. Minimum 1 mm (0.04 inch) thick stainless steel hat shape channel to hold clamps away from wall as indicated.
 - 2. Drill wall flange for 3 mm (1/8 inch) fasteners above and below clamp locations.
- D. Secure clamps to support with oval head machine screws or rivets into continuous reinforcing back of clamps.

2.13 FABRICATION – GENERAL

- A. Welding, AWS D10.4.
- B. Grind, dress, and finish welded joints to match finish of adjacent surface.
- C. Form exposed surfaces from one sheet of stock, free of joints.
- D. Provide steel anchors and components required for secure installation.

- E. Form flat surfaces without distortion. Keep exposed surfaces free from scratches and dents. Reinforce doors to prevent warp or twist.
- F. Isolate aluminum from dissimilar metals and from contact with building materials as required to prevent electrolysis and corrosion.
- G. Hot dip galvanized steel or stainless steel, anchors and fastening devices.
- H. Shop assemble accessories and package with components, anchors, fittings, fasteners and keys.
- I. Key items alike.
- J. Provide templates and rough in measurements.
- K. Round and deburr edges of sheets to remove sharp edges

2.14 FINISH

- A. Steel Paint Finish:
 - 1. Powder Coat Finish: Manufacturer's standard two coat finish system consisting of the following:
 - a. One coat primer.
 - b. One coat thermosetting topcoat.
 - c. Dry film Thickness: 0.05 mm (2 mils) minimum.
 - d. Color: Refer to Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Nylon Coated Steel: Nylon coating powder formulated for fluidized bonding process to steel to provide hard smooth, medium gloss finish, minimum 0.3 mm (0.012 inch) thick, rated as self-extinguishing when tested according to ASTM D635.
- C. Stainless Steel: NAAMM AMP 500; No. 4 polished finish.
- D. Aluminum Anodized Finish: NAAMM AMP 500.
 - 1. Clear Anodized Finish: AA C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
 - 2. Color Anodized Finish: AA C22A42 or AA C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.
- E. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.

2.15 ACCESSORIES

- A. Fasteners:
 - 1. Fasteners in Mental Health and Behavioral Patient Care Units: Tamper resistant hot dipped galvanized or stainless steel.
 - 2. Exposed Fasteners: Stainless steel or chromium plated brass, finish to match adjacent surface.
 - 3. Concealed Fasteners:
 - 4. Shower, Bathtubs, and High Moisture Areas: Stainless steel.
 - 5. Other Locations: Steel, hot dipped galvanized.
 - 6. Toggle Bolts: For use in hollow masonry or frame construction.

7. Sex bolts: For through bolting on thin panels.
8. Expansion Shields: Lead or plastic for solid masonry and concrete substrate as recommended by accessory manufacturer to suit application.
9. Screws:
10. ASME B18.6.4.
11. Fed. Spec. FF S 107, Stainless steel Type A.

- B. Adhesive: As recommended by manufacturer to suit application

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
 1. Verify blocking to support accessories is installed and located correctly.
- B. Verify location of accessories with Contracting Officer's Representative.

3.2 INSTALLATION

- A. Install products according to manufacturer's instructions // and approved submittal drawings //.
 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Install grab bars according to ASTM F446.
- C. Set work accurately, in alignment and where indicated, parallel or perpendicular as required to line and plane of surface. Install accessories plumb, level, free of rack and twist.
- D. Toggle bolt to steel anchorage plates in frame partitions and hollow masonry. Expansion bolt to concrete or solid masonry.
- E. Install accessories to function as designed. Perform maintenance service without interference with performance of other devices.
- F. Position and install dispensers, and other devices in countertops, clear of drawers, permitting ample clearance below countertop between devices, and ready access for maintenance.
- G. Align mirrors, dispensers and other accessories even and level, when installed in battery.
- H. Install accessories to prevent striking by other moving, items or interference with accessibility. .

3.3 CLEANING

- A. After installation, clean toilet accessories according to manufacturer's instructions.

3.4 PROTECTION

- A. Protect accessories from damage until project completion.

10/31/2024
Issued For Bid

City of Long Beach
Police Department Dispatch Communication Center
Including Locker Room / Bathroom Upgrade
1 West Chester Street, Long Beach, NY 11561
Ai-Alt File No. 23148.00

END OF SECTION

SECTION 10 51 13

METAL 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. Knocked-down corridor lockers.
2. Welded corridor lockers.
3. Knocked-down athletic lockers.
4. Welded athletic lockers.
5. Knocked-down, open-front athletic lockers.
6. Welded, open-front athletic lockers.
7. 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 metal locker.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.

- B. Shop Drawings: For metal 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. Full-size units of the following metal 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 metal lockers until spaces to receive them are clean, dry, and ready for their installation.
- B. Deliver master and control keys or combination control charts to Owner by registered mail or overnight package service.

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 concrete or wood bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal 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 Knocked-Down Metal Lockers: Two years from date of Substantial Completion.
- 4. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers, locker benches, and accessories from single source from single locker manufacturer.
 - 1. Obtain locks from single lock 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 KNOCKED-DOWN CORRIDOR LOCKERS

- A. Doors: One piece; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 - 1. Doors less than 12 inches (305 mm) wide may be fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
 - 2. Doors for box lockers less than 15 inches (381 mm) wide may be fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
 - 3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
 - 4. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet; welded to inner face of doors.
 - 5. Sound-Dampening Panels: Manufacturer's standard, designed to stiffen doors and reduce sound levels when doors are closed, of die-formed metal with full perimeter flange and sound-dampening material; welded to inner face of doors.
 - 6. Door Style: Vented panel as follows:
 - a. Louvered Vents: No fewer than six louver openings at top and bottom for single-tier or [three louver openings at top and bottom for double-tier lockers.]
 - b. Security Vents: Manufacturer's standard, stamped horizontal or vertical.
 - c. Perforated Vents: Manufacturer's standard shape and configuration.
 - d. Concealed Vents: Slotted perforations in top and bottom horizontal door return flanges.
- B. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 - 1. Tops, Bottoms, and Intermediate Dividers: 0.024-inch (0.61-mm) nominal thickness, with single bend at sides.

2. Backs and Sides: 0.024-inch (0.61-mm) nominal thickness, with full-height, double-flanged connections.
 3. Shelves: 0.024-inch (0.61-mm) nominal thickness, with double bend at front and single bend at sides and back.
- C. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
 2. Frame Vents: Fabricate face frames with vents.
- D. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Knuckle Hinges: Steel, full loop, five or seven knuckles, tight pin; minimum 2 inches (51 mm) high. Provide no fewer than three hinges for each door more than 42 inches (1067 mm) high.
 2. Continuous Hinges: Manufacturer's standard, steel, full height.
 3. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- E. Projecting Door Handle and Latch: Finger-lift latch control designed for use with either built-in combination locks or padlocks; positive automatic latching, chromium plated; pry and vandal resistant.
1. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.105-inch (2.66-mm) nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
 2. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic latching and prelocking.
 - a. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.105-inch (2.66-mm) nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
 - b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
 2. Single-Point Latching: Nonmoving latch hook designed to engage bolt of built-in combination or cylinder lock or with steel padlock loop that projects through recessed cup and is finished to match metal locker body.

- a. Latch Hook: Equip each door with one latch hook, fabricated from 0.105-inch (2.66-mm) nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
- G. Door Handle and Latch for Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.
- H. Locks: Combination padlocks or Built-in combination locks.
- I. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- J. Hooks: Manufacturer's standard ball-pointed type hooks, aluminum or steel; zinc plated.
- K. Coat Rods: Manufacturer's standard.
- L. Coat Rods: 1-inch- (25-mm-) diameter steel tube or rod, chrome finished.
- M. Legs: 6 inches (152 mm) high; formed by extending vertical frame members, or fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; welded to bottom of locker.
 - 1. Closed Front and End Bases: Fabricated from 0.036-inch (0.91-mm) nominal-thickness steel sheet.
- N. Continuous Zee Base: Fabricated from manufacturer's standard thickness, but not less than 0.060-inch (1.52-mm) nominal-thickness steel sheet.
 - 1. Height: 4 inches (102 mm).
- O. Continuous Sloping Tops: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch (0.91-mm) nominal-thickness steel sheet.
 - 1. Closures: Vertical-end type.
 - 2. Sloping-top corner fillers, mitered.
- P. Individual Sloping Tops: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet.
- Q. Recess Trim: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- R. Filler Panels: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch (0.91-mm) nominal-thickness steel sheet.
- S. Boxed End Panels: Fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet.
- T. Finished End Panels: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet.
- U. Center Dividers: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet.
- V. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
2. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.

W. Finish: Baked enamel or powder coat.

1. Color: As selected by Architect from manufacturer's full range.

2.4 WELDED CORRIDOR LOCKERS

- A. Doors: One piece; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
 2. Door Style: Vented panel as follows:
 - a. Louvered Vents: No fewer than six louver openings at top and bottom for single-tier or three louver openings at top and bottom for double-tier lockers.
 - b. Security Vents: Manufacturer's standard, stamped horizontal or vertical.
 - c. Perforated Vents: Manufacturer's standard shape and configuration.
- B. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 1. Tops, Bottoms, and Sides: 0.060-inch (1.52-mm) nominal thickness.
 2. Backs: 0.048-inch (1.21-mm) nominal thickness.
 3. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.
- C. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
 1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- D. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
 1. Knuckle Hinges: Steel, full loop, five or seven knuckles, tight pin; minimum 2 inches (51 mm) high. Provide no fewer than three hinges for each door more than 42 inches (1067 mm) high.
 2. Continuous Hinges: Manufacturer's standard, steel, full height.
 3. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- E. Projecting Door Handle and Latch: Finger-lift latch control designed for use with either built-in combination locks or padlocks; positive automatic latching, chromium plated; pry and vandal resistant.
 1. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.105-inch (2.66-mm)

- nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
2. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks or padlocks; positive automatic latching and prelocking.
 - a. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.120-inch (3.04-mm) nominal-thickness steel sheet; welded to full-height door strikes; with resilient silencer on each latch hook.
 - b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
 2. Single-Point Latching: Nonmoving latch hook designed to engage bolt of built-in combination or cylinder lock or with steel padlock loop that projects through recessed cup and is finished to match metal locker body.
 - a. Latch Hook: Equip each door with one latch hook, fabricated from 0.120-inch (3.04-mm) nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
- G. Door Handle and Latch for Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.
- H. Locks: Combination padlocks or Built-in combination locks.
- I. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- J. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- K. Coat Rods: Manufacturer's standard.
- L. Coat Rods: 1-inch- (25-mm-) diameter steel, chrome finished.
- M. Legs: 6 inches (152 mm) high; formed by extending vertical frame members, or fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet; welded to bottom of locker.
1. Closed Front and End Bases: Fabricated from 0.036-inch (0.91-mm) nominal-thickness steel sheet.
- N. Continuous Zee Base: Fabricated from, manufacturer's standard thickness, but not less than 0.060-inch (1.52-mm) nominal-thickness steel sheet.

1. Height: 4 inches (102 mm).
- O. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
 1. Closures: Vertical-end type.
- P. Recess Trim: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- Q. Filler Panels: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- R. Boxed End Panels: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
- S. Materials:
 1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
 2. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.
- T. Finish: Baked enamel or powder coat.
 1. Color: As selected by Architect from manufacturer's full range.

2.5 LOCKS

- A. Combination Padlocks: Key-controlled, three-number dialing combination locks; capable of five combination changes.
- B. Built-in Combination Locks: Key-controlled, three-number dialing combination locks; capable of at least five combination changes made automatically with a control key.
 1. Bolt Operation: Manually locking deadbolt or automatically locking spring bolt.
- C. Cylinder Locks: Built-in, flush, cam locks with five-pin tumbler keyway, keyed separately and master keyed. Furnish two change keys for each lock and [two] <Insert number> master keys.
 1. Key Type: Flat or Grooved, with minimum 2- by 2.68-inch (51- by 68.3-mm) key head for accessible lockers.
 2. Bolt Operation: Manually locking deadbolt or automatically locking spring bolt.
- D. Built-in, Card-Operated Locks: Self-contained units mounted on interior of door with replaceable lock cylinders keyed separately and master keyed. Mount instruction decals on both door faces. Furnish one change card key for each lock and one master card key.
 1. Bolt Operation: Manually locking deadbolt or automatically locking spring bolt.
- E. Digital Keypad Locks: Battery-powered electronic keypad with reprogrammable manager and owner codes that override access. Three consecutive incorrect code entries shall disable lock for three minutes.

1. Designed for permanently assigned access via entry of user's four-digit code.
2. Designed for shared or temporary access by multiple users, with user-defined code to lock and unlock. Provide LED indicator to show when lock is in use.

2.6 LOCKER BENCHES

- A. Provide bench units with overall assembly height of 17-1/2 inches (445 mm).
- B. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
 1. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick (241 mm wide by 32 mm thick).
 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.
 3. Plastic laminate over particleboard core, with two steel tubes running full length of top and positioned to receive pedestal fasteners.
 - a. Color: As selected by Architect from manufacturer's full range.
 4. Extruded aluminum with clear anodic finish.
- C. Fixed Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
 1. Tubular Steel: 1-1/2-inch- (38-mm-) diameter steel tubing threaded on both ends, with standard pipe flange at top and bell-shaped cast-iron base; with baked-enamel or powder-coat finish; anchored with exposed fasteners.
 - a. Color: As selected by Architect from manufacturer's full range.
 2. Tubular Steel: 1-1/4-inch- (32-mm-) diameter steel tubing, with 0.1265-inch- (3.2-mm-) thick steel flanges welded at top and base; with baked-enamel finish; anchored with exposed fasteners.
 - a. Color: As selected by Architect from manufacturer's full range.
- D. 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 (3-mm-thick by 76-mm-wide) channel or 1/4-inch-thick by 3-inch-wide (6-mm-thick by 76-mm-wide) bar stock, shaped into trapezoidal form; with nonskid pads at bottom.
 - a. Finish: Black anodic finish.
 2. Stainless Steel: 1/8-inch-thick by 3-inch-wide (3-mm-thick by 76-mm-wide) channel or 1/4-inch-thick by 3-inch-wide (6-mm-thick by 76-mm-wide) bar stock, shaped into trapezoidal form; with nonskid pads at bottom.
 - a. Finish: Manufacturer's standard.
- E. Materials:
 1. Stainless Steel: ASTM A 666, Type 304.

2. Plastic Laminate: NEMA LD 3, Grade HGP.
3. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated.
4. Steel Tube: ASTM A 500/A 500 M, cold rolled.
5. Particleboard: ANSI A208.1, Grade M-2.

2.7 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- C. Equipment: Provide each locker with an identification plate and the following equipment:
 1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
 2. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
 3. Triple-Tier Units: One double-prong ceiling hook.
 4. Coat Rods: For each compartment of each locker.
 5. Open-Front Athletic Lockers: Two single-prong wall hooks bolted to locker back and coat rod.
- D. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.
- E. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.
- F. Accessible Lockers: Fabricate as follows:
 1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
- G. Continuous Base: Formed into channel or zee profile for stiffness, and fabricated in lengths as long as practical to enclose base and base ends of metal lockers; finished to match lockers.
- H. 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.
- I. 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.

- J. Recess Trim: Fabricated with minimum 2-1/2-inch (64-mm) face width and in lengths as long as practical; finished to match lockers.
- K. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
- L. Boxed End Panels: Fabricated with 1-inch- (25-mm-) wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - 1. Provide one-piece panels for double-row (back-to-back) locker ends.
- M. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - 1. Provide one-piece panels for double-row (back-to-back) locker ends.
- N. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

2.8 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

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 (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
 - 3. Anchor back-to-back metal lockers to floor.

- B. Knocked-Down Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.
- C. Welded Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- D. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal 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 metal locker, centered, with a least two aluminum rivets.
- E. 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 metal lockers with concealed clips.
 - 2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
 - 3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
 - 5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- F. Fixed Locker Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches (1830 mm) apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.
- G. Freestanding Locker Benches: Place benches in locations indicated on Drawings.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

SECTION 10 56 13

METAL STORAGE SHELVING

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. Case-type metal storage shelving.
2. Four-post metal storage shelving.
3. Post-and-beam metal storage shelving.

- B. Related Requirements:

1. Section 114000 "Foodservice Equipment" for metal shelving in kitchen, pantry, and refrigerated spaces.
2. Section 115123 "Library Stack Systems" for library shelving systems including cantilever-bracket shelving supported by wall-mounted standards.
3. Section 123553.13 "Metal Laboratory Casework" for metal shelving in laboratories.
4. Section 123570 "Healthcare Casework" for metal shelving in central sterile supply rooms, clean utility rooms, and similar spaces for the storage of medical instruments and supplies.

1.3 COORDINATION

- A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.
- B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.
- B. Shop Drawings: For customized metal storage shelving.
 1. Include plans, elevations, sections, and attachment details.

2. Include installation details of connectors, lateral bracing, and special bracing.
- C. Samples for Initial Selection: For units with factory-applied color finishes. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For the following components, of size indicated below:
 1. Vertical Posts: 12 inches (305 mm) tall.
 2. Shelves: Full size, but not more than 24 inches wide by 12 inches deep (610 mm wide by 305 mm deep).
 3. Connectors for Shelf to Post: Full size.
 4. Shelf-Label Holders: Full size.
- E. Product Schedule: For metal storage shelving.
- F. Delegated-Design Submittal: For metal storage shelving indicated to comply with performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 1. Design Calculations: Calculate requirements for seismic restraints.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Seismic Qualification Certificates: For metal storage shelving, accessories, and components, from manufacturer.
- C. Product Certificates: For each type of metal storage shelving from manufacturer.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal storage shelving to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Shelves: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than five shelves.
 2. Shelf-to-Post Connectors: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 connectors.
 3. Shelf-Label Holders: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 holders.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1.10 SITE CONDITIONS

- A. Environmental Limitations: Do not deliver or install metal storage shelving 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal storage shelving, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance for Case-Type and Four-Post Metal Storage Shelving: Capable of withstanding the loads indicated according to MH 28.1.
- C. Structural Performance for Post-and-Beam Metal Storage Shelving: Capable of withstanding the loads indicated according to MH 28.2.
- D. Seismic Performance: Metal storage shelving shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 CASE-TYPE METAL STORAGE SHELVING

- A. General: Factory-formed, field-assembled, freestanding, case-type metal storage shelving system, designed for shelves to span between and be supported by sheet metal end panels (without posts), with shelves adjustable over the height of shelving unit. Fabricate shelf units with end panel at each end so each unit is independent. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.
- B. Load-Carrying Capacity per Shelf: 200 lb (91 kg).
- C. End Panels: Fabricated from cold-rolled steel sheet, with concealed perforations at front and back edges at manufacturer's standard spacing for receiving adjustable shelf clips.
 - 1. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf and number of shelves.
 - 2. Adjustable Shelf Clips: Fabricated from 0.036-inch- (0.91-mm-) nominal thickness, cold-rolled steel; with projections designed to engage at least two perforations in end panels.
- D. End Panels: Fabricated from cold-rolled steel sheet; with horizontal slots spaced at manufacturer's standard spacing for supporting shelves.
 - 1. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf and number of shelves.
- E. Back Panel: One piece, fabricated from cold-rolled steel sheet.
 - 1. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.

- F. Shelves: Fabricated from cold-rolled steel sheet [, with slots or holes at 2 inches (51 mm) o.c. for shelf dividers]. Fabricate shelves with vertical front that is flanged and returned.
 - 1. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf and number of shelves.
- G. Shelf Quantity: Four shelves per shelving unit in addition to top and bottom shelf.
- H. Base: Closed front, with base strips fabricated from same material and with same finish as end panels.
- I. Overall Unit Width: 36 inches (914 mm)
- J. Overall Unit Depth: 12 inches (305 mm)
- K. Overall Unit Height: 72 $\frac{3}{4}$ inches
- L. Accessories:
 - 1. Finished End Panels: Fabricated as solid full-height panels from same material and with same finish as end panels, with trim for a finished appearance along edges abutting end panels and top shelf.
 - 2. Shelf Dividers: Fabricated from same material and with same finish as shelves; full-height type.
 - 3. Bins: Fabricated from same material and with same finish as shelves;
 - 4. Shelf-Label Holders: Clear plastic, designed to clip onto front edge of shelf.
- M. Steel Finish: Powder coat.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 FOUR-POST METAL STORAGE SHELVING

- A. Open Four-Post Metal Storage Shelving: Factory-formed, field-assembled, freestanding system, designed for shelves to span between and be supported by corner posts, with shelves adjustable over the height of shelving unit. Fabricate initial shelving unit with a post at each corner. Fabricate additional shelving units similarly, so each unit is independent. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.
 - 1. Load-Carrying Capacity per Shelf: 600 lb (272 kg).
 - 2. Posts: Fabricated from hot-rolled steel; in manufacturer's standard shape; with perforations at 1-1/2 inches (38 mm) o.c. to receive shelf-to-post connectors.
 - a. Steel Thickness, Nominal: As required for load-carrying capacity per shelf and number of shelves.
 - b. Add-On Shelf Posts: Fabricated from hot-rolled steel, manufacturer's standard shape; perforated to match main posts and of same thickness.
 - c. Post Base: Bolt leveler or Adjustable steel floor plate, drilled for floor anchors.
 - 3. Bracing: Manufacturer's standard, double diagonal cross bracing at back and ends; as required for stability, load-carrying capacity of shelves, and number of shelves.
 - 4. Back Panel: One piece fabricated from cold-rolled steel sheet.
 - a. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.

5. End Panels: Fabricated from cold-rolled steel sheet.
 - a. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.
 6. Solid-Type Shelves: Fabricated from steel or metallic-coated-steel sheet as follows:
 - a. Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.
 - b. Metallic-Coated Steel Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.
 - c. Slots or Holes for Shelf Dividers: 2 inches (51 mm) o.c.
 - d. Fabricate fronts and backs of shelves with box-formed edges, with corners lapped and welded.
 - e. Fabricate fronts and backs of shelves with vertical edges that are flanged and returned, with edges reinforced with steel bars.
 7. Framed-Type Wire Shelves: Steel or Metallic-coated-steel wire; with shelf frame fabricated from same material and with same finish as posts.
 8. Truss-Type Wire Shelves: Manufacturer's standard, chrome-plated wire-over-wire construction, with downturned wire truss edges.
 9. Shelf Quantity: Four shelves per shelving unit in addition to top and bottom shelf.
 10. Shelf-to-Post Connectors: Manufacturer's standard connectors.
 11. Base: Closed, with base strips fabricated from same material and with same finish as shelving.
 12. Overall Unit Width: 36 inches (914 mm)
 13. Overall Unit Depth: 12 inches (305 mm)
 14. Overall Unit Height: 72 $\frac{3}{4}$ inches (1829 mm)
 15. Accessories:
 - a. Finished End Panels: Fabricated as solid full-height panels from manufacturer's standard thickness cold-rolled steel sheet and with same finish as posts, with trim for a finished appearance along edges abutting posts and top shelf.
 - b. Shelf Dividers: Fabricated from same material and with same finish as shelves; full-height type.
 - c. Bins: Fabricated from same material and with same finish as shelves; size as indicated on Drawings
 - d. Shelf-Label Holders: Clear plastic, designed to clip onto front edge of shelf.
 16. Steel Finish: Powder Coat
 - a. Color and Gloss: As selected by Architect from manufacturer's full range].
- B. Wire-Type, Four-Post Metal Storage Shelving: Factory-formed, field-assembled, freestanding system without back or end panels, designed for shelves to span between and be supported by corner posts, with shelves adjustable over the entire height of shelving unit. Fabricate initial shelving unit with a post at each corner. Fabricate additional shelving units similarly, so each unit is independent. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.
1. Load-Carrying Capacity per Shelf: 600 lb (272 kg)
 2. Posts: Fabricated from 1-inch- (25-mm-) OD, square tubing of indicated material; with grooves or notches at 1 inch (25 mm) o.c. to receive shelf-to-post connectors. Label posts with numbers at not less than 2 inches (51 mm) o.c. for determining shelf height.
 - a. Post Material: Stainless steel.

- b. Post Base: Bolt leveler or Adjustable steel floor plate, drilled for floor anchors.
- c. Post Cap: Nylon or plastic.
- 3. Framed-Type Wire Shelves: Steel or Metallic-coated-steel wire-over-wire construction, with shelf frame fabricated from same material and with same finish as posts; with manufacturer's standard post collar, designed to engage collet (wedge), welded at each corner.
- 4. Truss-Type Wire Shelves: Manufacturer's standard, chrome-plated wire-over-wire construction, with downturned wire truss edges; with manufacturer's standard post collar, designed to engage collet (wedge), welded at each corner.
- 5. Waterfall-Type Wire Shelves: Steel or Metallic-coated-steel wire-over-wire waterfall construction; with manufacturer's standard post collar, designed to engage collet (wedge), welded at each corner.
- 6. Solid-Type Shelves: Fabricated from 0.050-inch- (1.27-mm-) thick, stainless-steel sheet.
- 7. Shelf Quantity: Four shelves per shelving unit in addition to top and bottom shelf.
- 8. Shelf-to-Post Connectors: Manufacturer's standard one-piece collet (wedge), designed to engage post collar attached to shelves.
- 9. Bracing: Manufacturer's standard diagonal cross bracing, as required for stability, load-carrying capacity of shelves, and number of shelves.
- 10. Overall Unit Width: 36 inches (914 mm)
- 11. Overall Unit Depth: 12 inches (305 mm)
- 12. Overall Unit Height: 72 $\frac{3}{4}$ inches
- 13. Accessories:
 - a. Shelf Dividers: Fabricated from same material and with same finish as shelves; full-height type.
 - b. Shelf Inlay: Manufacturer's standard clear plastic mat.
 - c. Storage Basket: Edge-of-shelf-mounted wire basket; fabricated from same material and with same finish as shelves.
 - d. Back Ledges: 4 inches (102 mm) high, fabricated from same material and with same finish as shelves.
 - e. Side Ledges: 1 inch (25 mm) high, fabricated from same material and with same finish as shelves.
 - f. Garment Hanger Tube: Width of 21 inches (533 mm) shelves; with mounting brackets.
 - g. Shelf-Label Holders: Clear plastic, designed to clip onto front edge of shelf.
- 14. Steel Finish: Powder coat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.
- 15. Stainless-Steel Finish: Manufacturer's standard nondirectional-polish finish.

2.4 MATERIALS

- A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with G60 (Z180) zinc (galvanized) or A60 (ZF180) zinc-iron-alloy (galvannealed) coating.
- D. Steel Tubing: ASTM A 513/A 513M, Type 2.

- E. Stainless-Steel Tubing: ASTM A 554, Grade MT-304.
- F. Steel Wire: ASTM A 899.
- G. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
- H. Particleboard: ANSI A208.1.
- I. Hardboard: ANSI A135.4.
- J. Floor Anchors: Galvanized-steel, post-installed expansion anchors. Provide number per unit recommended by manufacturer unless additional anchors are indicated in calculations.
- K. Wall Anchors: Manufacturer's standard, galvanized-steel anchors designed to secure metal storage shelving to adjacent wall. Provide one per shelving unit for each shelving unit adjacent to a wall unless additional anchors are indicated in calculations.

2.5 FABRICATION

- A. Shop Fabrication: Prefabricate shelving components in shop to greatest extent possible to minimize field fabrication; temporarily preassemble shelving components where necessary to ensure that field-assembled components fit together properly. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Fabricate metal storage shelving square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.
 - 1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
 - 2. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
 - 3. Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.
 - 4. Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.
- C. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- D. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a 1/2-inch- (13-mm-) wide hem on the concealed side; ease edges of metal plate to radius of approximately 1/32 inch (0.8 mm). Shear and punch metals cleanly and accurately. Remove burrs.
- E. Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" 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.

2.7 METALLIC-COATED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces of oil and other contaminants. Use cleaning methods that do not leave residue. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A 780/A780M.
- B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

2.8 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling."
- B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

2.9 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 areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine floors for suitable conditions where metal storage shelving will be installed.
- C. Examine walls to which metal storage shelving will be attached for properly located blocking, grounds, or other solid backing for attachment of support fasteners.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Vacuum finished floor over which metal storage shelving is to be installed.

3.3 INSTALLATION

- A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.
 1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
 3. Adjust post-base bolt leveler to achieve level and plumb installation.
 4. Anchor shelving units to floor with floor anchors through floor plate. Shim floor plate to achieve level and plumb installation.
 5. Install seismic restraints.
 6. Connect side-to-side shelving units together.
 7. Install shelves in each shelving unit at spacing indicated on Drawings or, if not indicated, at equal spacing.
 - a. Case-Type Metal Storage Shelving: Install adjustable shelf clips at front and back of each shelf.
 - b. Four-Post Metal Storage Shelving: Install four clips, one at each post, for support of each shelf; with clips fully engaged in post perforations.
 - c. Post-and-Beam Metal Storage Shelving: Install beams with beam-to-post connectors fully engaged in post perforations.
- B. Accessories:
 1. Install finished end panels and trim at exposed ends of shelving units.
 2. Shelf Dividers: Install dividers of types and locations indicated on Drawings.
 3. Bins: Install at locations indicated on Drawings.
 4. Shelf-Label Holders: Install at locations indicated on Drawings within each shelving unit.
 5. Record Box Support Rails: Provide two for each record storage box.
 6. Shelf Inlays: Install at locations indicated on Drawings.
 7. Storage Baskets: Install at locations indicated on Drawings.
 8. Back Ledges: Install one per shelf.
 9. Side Ledges: Install on each side of each shelf.
 10. Garment Hanger Tubes: Install where directed.

3.4 ERECTION TOLERANCES

- A. Erect four-post metal storage shelving to a maximum tolerance from vertical of 1/2 inch (13 mm) in up to 10 feet (3 m) of height, not exceeding 1 inch (25 mm) for heights taller than 10 feet (3 m).
- B. Erect post-and-beam metal storage shelving to a maximum tolerance from vertical of 1/4 inch (6 mm) in 84 inches (2134 mm) of height.

3.5 ADJUSTING

- A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.
- B. Adjust and lubricate operable components to operate smoothly and easily, without binding or warping. Check and readjust operating hardware.

- C. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.
- D. Replace metal storage shelving that has been damaged or has deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 22 11 13

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service, fire-service mains, or combined water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.03 DEFINITIONS

- A. EPDM: Ethylene propylene diene terpolymer rubber.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PA: Polyamide (nylon) plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. RTRF: Reinforced thermosetting resin (fiberglass) fittings.
- H. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 - 1. Wiring Diagrams: Power, signal, and control wiring for alarms.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

- B. Field quality-control test reports.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.07 QUALITY ASSURANCE

- A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

- E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

- F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

- G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.

2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.09 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 1. Notify Architect, Construction Manager, Landlord or Owner no fewer than two (2) days in advance of proposed interruption of service.
 2. Do not proceed with interruption of water-distribution service without Architect, Construction Manager, Landlord or Owner written permission.

1.10 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.01 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type K, ASTM B 88M, Type A), and ASTM B 88, Type L, water tube, annealed temper.
 1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
 2. Copper, Pressure-Seal Fittings:
 - a. NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
 - b. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- B. Hard Copper Tube: ASTM B 88, Type K, ASTM B 88M, Type A), and ASTM B 88, Type L, water tube, drawn temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Copper, Pressure-Seal Fittings:
 - a. NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
 - b. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
- D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.02 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 2. Gaskets: AWWA C111, rubber.
- C. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.
 1. Grooved-End, Ductile-Iron Pipe Appurtenances:
 - a. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
 - b. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.
- D. Flanges: ASME 16.1, Class 125, cast iron.

2.03 PE PIPE AND FITTINGS

- A. PE, ASTM Pipe: ASTM D 2239, SDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 200 psig (1380 kPa).
 1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
 2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

- B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 200 psig (1380 kPa).
 - 1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 200 psig (1380 kPa).
- C. PE, Fire-Service Pipe: ASTM F 714, AWWA C906, or equivalent for PE water pipe; FMG approved, with minimum thickness equivalent to FMG Class 150, and Class 200.
 - 1. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

2.04 PVC PIPE AND FITTINGS

- A. PVC, Schedule 40 Pipe: ASTM D 1785.
 - 1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.
- B. PVC, Schedule 80 Pipe: ASTM D 1785.
 - 1. PVC, Schedule 80 Socket Fittings: ASTM D 2467.
 - 2. PVC, Schedule 80 Threaded Fittings: ASTM D 2464.
- C. PVC, AWWA Pipe: AWWA C900, Class 150, and Class 200, with bell end with gasket, and with spigot end.
 - 1. Comply with UL 1285 for fire-service mains if indicated.
 - 2. PVC Fabricated Fittings: AWWA C900, Class 150, and Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
 - 3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
 - 4. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Gaskets: AWWA C111, rubber
 - 5. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.05 FIBERGLASS PIPE AND FITTINGS

- A. AWWA RTRP: AWWA C950, Class 150, Class 200, and Class 250, Type I, Grade 1, epoxy, or Grade 2, polyester, with bell-and-spigot ends for bonded joints. Liner is optional, unless otherwise indicated. Include FMG approval if used for fire-service mains.
 - 1. RTRF: AWWA C950, similar to pipe in material, pressure class, and joining method.
- B. UL RTRP: UL 1713, Class 150, Class 200, and Class 250, with bell-and-spigot ends with gasket or seal for gasketed joints. Liner is optional, unless otherwise indicated.

1. RTRF: Similar to pipe in material, pressure class, and joining method.

2.06 SPECIAL PIPE FITTINGS

- A. Ductile-Iron Rigid Expansion Joints:
 1. Description: Three-piece, ductile-iron assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - a. Pressure Rating: 250 psig (1725 kPa) minimum.
- B. Ductile-Iron Flexible Expansion Joints:
 1. Description: Compound, ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections. Assemble components for offset and expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - a. Pressure Rating: 250 psig (1725 kPa) minimum.
- C. Ductile-Iron Deflection Fittings:
 1. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - a. Pressure Rating: 250 psig (1725 kPa) minimum.

2.07 JOINING MATERIALS

- A. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.
- B. Brazing Filler Metals: AWS A5.8, BCuP Series.
- C. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.
- D. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.08 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.
 - a. Standard: AWWA C219.

- b. Center-Sleeve Material: Carbon steel, Stainless steel, Ductile iron, or Malleable iron.
- c. Gasket Material: Natural or synthetic rubber.
- d. Pressure Rating: 150 psig (1035 kPa); minimum.
- e. Metal Component Finish: Corrosion-resistant coating or material.

C. Split-Sleeve Pipe Couplings:

- 1. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.
 - a. Standard: AWWA C219.
 - b. Sleeve Material: Carbon steel, or Stainless steel.
 - c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
 - d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
 - e. Pressure Rating: 150 psig (1035 kPa) minimum.
 - f. Metal Component Finish: Corrosion-resistant coating or material.

D. Flexible Connectors:

- 1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.
- 2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

E. Dielectric Fittings:

- 1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

2. Dielectric Unions:

a. Description:

- 1) Standard: ASSE 1079.
- 2) Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C)
- 3) End Connections: Solder-joint copper alloy and threaded ferrous.

3. Dielectric Flanges:

a. Description:

- 1) Standard: ASSE 1079.
- 2) Factory-fabricated, bolted, companion-flange assembly.
- 3) Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C)
- 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

4. Dielectric-Flange Insulating Kits:

a. Description:

- 1) Nonconducting materials for field assembly of companion flanges.

- 2) Pressure Rating: 150 psig (1035 kPa)
- 3) Gasket: Neoprene or phenolic.
- 4) Bolt Sleeves: Phenolic or polyethylene.
- 5) Washers: Phenolic with steel backing washers

5. Dielectric Nipples:

a. Description:

- 1) Standard: IAPMO PS 66
- 2) Electroplated steel nipple, complying with ASTM F 1545.
- 3) Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).
- 4) End Connections: Male threaded or grooved.
- 5) Lining: Inert and noncorrosive, propylene.

2.09 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Sheet or tube.
3. Material: LLDPE film of 0.008-inch (0.20-mm) minimum thickness.
4. Material: LLDPE film of 0.008-inch (0.20-mm) minimum thickness, or high-density, cross laminated PE film of 0.004-inch (0.10-mm) minimum thickness.
5. Material: High-density, cross laminated PE film of 0.004-inch (0.10-mm) minimum thickness.
6. Color: Black, or Natural.

2.10 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Nonrising-Stem, Metal-Seated Gate Valves:

- a. Description: Gray- or ductile-iron body and bonnet; with cast-iron or bronze double-disc gate, bronze gate rings, bronze stem, and stem nut.
 - 1) Standard: AWWA C500.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.

2. Nonrising-Stem, Resilient-Seated Gate Valves:

- a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig (1380 kPa).
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550

3. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:

- a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.

- 1) Standard: AWWA C509.
- 2) Minimum Pressure Rating: 250 psig (1725 kPa).
- 3) End Connections: Push on or mechanical joint.
- 4) Interior Coating: Complying with AWWA C550.

4. OS&Y, Rising-Stem, Metal-Seated Gate Valves:

- a. Description: Cast- or ductile-iron body and bonnet, with cast-iron double disc, bronze disc and seat rings, and bronze stem.

- 1) Standard: AWWA C500.
- 2) Minimum Pressure Rating: 200 psig (1380 kPa).
- 3) End Connections: Flanged.

5. OS&Y, Rising-Stem, Resilient-Seated Gate Valves:

- a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.

- 1) Standard: AWWA C509.
- 2) Minimum Pressure Rating: 200 psig (1380 kPa).
- 3) End Connections: Flanged.

B. UL/FMG, Cast-Iron Gate Valves

1. UL/FMG, Nonrising-Stem Gate Valves:

- a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
- 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

2. OS&Y, Rising-Stem Gate Valves:

- a. Description: Iron body and bonnet and bronze seating material.
- 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).
 - 3) End Connections: Flanged.

C. Bronze Gate Valves:

1. OS&Y, Rising-Stem Gate Valves

- a. Description: Bronze body and bonnet and bronze stem.
- 1) Standards: UL 262 and FMG approved.
 - 2) Minimum Pressure Rating: 175 psig (1207 kPa).

- 3) End Connections: Threaded
2. Nonrising-Stem Gate Valves:
 - a. Description: Class 125, Type 1, bronze with solid wedge, threaded ends, and malleable-iron handwheel
 - 1) Standard: MSS SP-80.

2.11 GATE VALVE ACCESSORIES AND SPECIALTIES

- A. Tapping-Sleeve Assemblies:
 1. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.
 - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, nonrising-stem, metal; resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.
- B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches (125 mm) in diameter.
 1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.12 CHECK VALVES

- A. AWWA Check Valve
 1. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.
 - a. Standard: AWWA C508.
 - b. Pressure Rating: 175 psig (1207 kPa).
- B. UL/FMG, Check Valves
 1. Description: Swing-check type with pressure rating; rubber-face checks, unless otherwise indicated; and ends matching piping.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig (1207 kPa).

2.13 DETECTOR CHECK VALVES

A. Detector Check Valves:

1. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig (1207 kPa).
 - c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.
2. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 175 psig (1207 kPa).

2.14 BUTTERFLY VALVES

A. AWWA Butterfly Valves:

1. Description: Rubber seated.
 - a. Standard: AWWA C504.
 - b. Body: Cast or ductile iron.
 - c. Body Type: Wafer or flanged.
 - d. Pressure Rating: 150 psig (1035 kPa).

B. UL Butterfly Valves:

1. Description: Metal on resilient material seating.
 - a. Standards: UL 1091 and FMG approved.
 - b. Body: Cast or ductile iron.
 - c. Body Type: Wafer or flanged.
 - d. Pressure Rating: 175 psig (1207 kPa)

2.15 PLUG VALVES

A. Plug Valves:

1. Description: Resilient-seated eccentric.
 - a. Standard: MSS SP-108.
 - b. Body: Cast iron.
 - c. Pressure Rating: 175-psig (1207-kPa) minimum CWP.
 - d. Seat Material: Suitable for potable-water service.

2.16 CORPORATION VALVES & CURB VALVES

- A. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.
 - 1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
 - 2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
 - 3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.
- B. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.
- C. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches (75 mm) in diameter.
 - 1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

2.17 WATER METERS

- A. Water meters will be furnished by utility company.
- B. Displacement-Type Water Meters:
 - 1. Description: With bronze main case.
 - a. Standard: AWWA C700.
 - b. Registration: Flow in gallons.
- C. Turbine-Type Water Meters:
 - 1. Description:
 - a. Standard: AWWA C701.
 - b. Registration: Flow in gallons.
- D. Compound-Type Water Meters:
 - 1. Description:
 - a. Standard: C702
 - b. Registration: Flow in gallons.
- E. Remote Registration System:
 - 1. Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a. Standard: AWWA C706.
 - b. Registration: Flow in gallons.

F. Remote Registration System:

1. Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a. Standard: AWWA C707.
 - b. Registration: Flow in gallons.
 - c. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 - d. Visible Display Units: Comply with utility company requirements for type and quantity.

2.18 DETECTOR-TYPE WATER METERS

A. Detector-Type Water Meters: Description: Main line, proportional meter with second meter on bypass. Register flow in gallons.

1. Standards: AWWA C703, UL listed, and FMG approved.
2. Pressure Rating: 150 psig (1035 kPa).
3. Bypass Meter: AWWA C701, turbine, or AWWA C702, compound-type, bronze case.
 - a. Size: At least one-half nominal size of main-line meter.

B. Remote Registration System:

1. Description: Utility company standard; direct-reading type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a. Standard: AWWA C706.
 - b. Registration: Flow in gallons.

C. Remote Registration System:

1. Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
 - a. Standard: AWWA C707.
 - b. Registration: Flow in gallons.
 - c. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
 - d. Visible Display Units: Comply with utility company requirements for type and quantity.

2.19 PRESSURE REDUCING VALVES

A. Water Regulators:

1. Standard: ASSE 1003.
2. Pressure Rating: Initial pressure of 150 psig (1035 kPa).
3. Body: Bronze with chrome-plated finish; for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved; for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).
4. Valves for Booster Heater Water Supply: Include integral bypass.
5. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

B. Water Control Valves:

1. Description: Pilot-operation, diaphragm-type, single-seated main water control valve with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.
 - a. Pressure Rating: Initial pressure of 150 psig (1035 kPa) minimum.
 - b. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
 - c. End Connections: Threaded for NPS 2 (DN 50) and smaller for NPS 2-1/2 (DN 65) and larger.

2.20 RELIEF VALVES

A. Air-Release Valves:

1. Description: Hydromechanical device to automatically release accumulated air.
 - a. Standard: AWWA C512.
 - b. Pressure Rating: 300 psig (2070 kPa).
 - c. Body Material: Cast iron.
 - d. Trim Material: Stainless steel, brass, or bronze.

B. Air/Vacuum Valves:

1. Description: Direct-acting, float-operated, hydromechanical device with large orifice to automatically release accumulated air or to admit air during filling of piping.
 - a. Standard: AWWA C512.
 - b. Pressure Rating: 300 psig (2070 kPa)
 - c. Body Material: Cast iron.
 - d. Trim Material: Stainless steel, brass, or bronze.

C. Combination Air Valves:

1. Description: Float-operated, hydromechanical device to automatically release accumulated air or to admit air.
 - a. Standard: AWWA C512.
 - b. Pressure Rating: 300 psig (2070 kPa)
 - c. Body Material: Cast iron.
 - d. Trim Material: Stainless steel, brass, or bronze.

2.21 VACUUM BREAKERS

A. Pressure Vacuum Breaker Assembly:

1. Standard: ASSE 1020.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 5 psig (35 kPa); maximum, through middle 1/3 of flow range.
4. Accessories: Ball valves on inlet and outlet.

2.22 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Standard: ASSE 1013 or AWWA C511.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.
4. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved; steel with interior lining complying with AWWA C550 or that is FDA approved, stainless steel for NPS 2-1/2 (DN 65) and larger.
5. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
6. Configuration: Designed for horizontal, straight through; vertical inlet, horizontal center section, and vertical outlet flow.
7. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

B. Double-Check, Backflow-Prevention Assemblies:

1. Standard: ASSE 1015 or AWWA C510.
2. Operation: Continuous-pressure applications, unless otherwise indicated.
3. Pressure Loss: 5 psig (35 kPa); maximum, through middle 1/3 of flow range.
4. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved; steel with interior lining complying with AWWA C550 or that is FDA approved, stainless steel for NPS 2-1/2 (DN 65) and larger.
5. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
6. Configuration: Designed for horizontal, straight through flow.
7. Accessories: Ball valves with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate valves with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.

C. Reduced-Pressure-Detector, Fire-Protection Backflow Preventer Assemblies:

1. Standards: ASSE 1047 and UL listed or FMG approved.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.
4. Body: Cast iron with interior lining complying with AWWA C550 or that is FDA approved Steel with interior lining complying with AWWA C550 or that is FDA approved Stainless steel.
5. End Connections: Flanged.
6. Configuration: Designed for horizontal, straight through, vertical inlet, horizontal center section, and vertical outlet flow.
7. Accessories:
 - a. Valves: UL 262, FMG-approved, OS&Y gate type with flanged ends on inlet and outlet.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.
 - c. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

D. Double-Check, Detector-Assembly Backflow Preventers:

1. Standards: ASSE 1048 and UL listed or FMG approved.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.
4. Body: Cast iron with interior lining complying with AWWA C550 or that is FDA approved Steel with interior lining complying with AWWA C550 or that is FDA approved Stainless steel.
5. End Connections: Flanged.
6. Configuration: Designed for horizontal, straight through; vertical inlet, horizontal center section, and vertical outlet flow.
7. Accessories:
 - a. Valves: UL 262, FMG-approved, OS&Y gate type with flanged ends on inlet and outlet.
 - b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

E. Backflow Preventer Test Kits:

1. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.23 WATER METER BOXES

- A. Description: Cast-iron body and cover for disc-type water meter, with lettering "WATER METER" in cover; and with slotted, open-bottom base section of length to fit over service piping
 1. Option: Base section may be cast-iron, PVC, clay, or other pipe.
- B. Description: Cast-iron body and double cover for disc-type water meter, with lettering "WATER METER" in top cover; and with separate inner cover; air space between covers; and slotted, open-bottom base section of length to fit over service piping.
- C. Description: Polymer-concrete body and cover for disc-type water meter, with lettering "WATER" in cover; and with slotted, open-bottom base section of length to fit over service piping. Include vertical and lateral design loadings of 15,000 lb minimum over 10 by 10 inches (6800 kg minimum over 254 by 254 mm) square.

2.24 CONCRETE VAULTS

- A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C 857 and made according to ASTM C 858.
 1. Ladder: ASTM A 36/A 36M, steel or polyethylene-encased steel steps.
 2. Manhole: ASTM A 48/A 48M Class No. 35A minimum tensile strength, gray-iron traffic frame and cover
 - a. Dimension: 24-inch (610-mm) minimum diameter, unless otherwise indicated.
 3. Manhole: ASTM A 536, Grade 60-40-18, ductile-iron traffic frame and cover.
 - a. Dimension: 24-inch- (610-mm-) minimum diameter, unless otherwise indicated.

4. Drain: ASME A112.6.3, cast-iron floor drain with outlet of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.25 PROTECTIVE ENCLOSURES

A. Freeze-Protection Enclosures:

1. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F (4 deg C) when external temperatures reach as low as minus 34 deg F (minus 36 deg C).
 - a. Standard: ASSE 1060.
 - b. Class I: For equipment or devices other than pressure or atmospheric vacuum breakers.
 - c. Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
 - 1) Housing: Reinforced aluminum, or fiberglass construction.
 - a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
 - b) Drain opening for units with drain connection.
 - c) Access doors with locking devices.
 - d) Insulation inside housing.
 - e) Anchoring devices for attaching housing to concrete base.
 - 2) Electric heating cable or heater with self-limiting temperature control.

B. Weather-Resistant Enclosures:

1. Description: Uninsulated enclosure designed to protect aboveground water piping, equipment, or specialties from weather and damage.
 - a. Standard: ASSE 1060.
 - b. Class III: For equipment or devices other than pressure or atmospheric vacuum breakers.
 - c. Class III-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
 - 1) Housing: Reinforced aluminum, or fiberglass construction.
 - a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
 - b) Drain opening for units with drain connection.
 - c) Access doors with locking devices.
 - d) Anchoring devices for attaching housing to concrete base.

C. Expanded-Metal Enclosures:

1. Description: Enclosure designed to protect aboveground water piping, equipment, or specialties from damage.

- a. Material: ASTM F 1267, expanded metal side and top panels, of weight and with reinforcement of same metal at edges as required for rigidity.
- b. Type: Type I, expanded, or Type II, expanded and flattened.
- c. Class: Class 1, uncoated carbon steel, or Class 2, hot-dip, zinc-coated carbon steel, or Class 3, corrosion-resisting steel.
- d. Finish: Manufacturer's enamel paint.
- e. Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
- f. Locking device.
- g. Lugs or devices for securing enclosure to base.

D. Enclosure Bases:

- 1. Description: 4-inch- (100-mm) minimum thickness precast concrete, of dimensions required to extend at least 6 inches (150 mm) beyond edges of enclosure housings. Include openings for piping.

2.26 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

- 1. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, 5-1/4-inch (133-mm) main valve, drain valve, and NPS 6 (DN 150) mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
 - a. Standard: AWWA C502.
 - b. Pressure Rating: 150 psig (1035 kPa) minimum; 250 psig (1725 kPa).
- 2. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, 5-1/4-inch (133-mm) main valve, drain valve, and NPS 6 (DN 150) mechanical-joint inlet. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
 - a. Standards: UL 246, FMG approved.
 - b. Pressure Rating: 150 psig (1035 kPa) minimum; 250 psig (1725 kPa).
 - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
 - d. Operating and Cap Nuts: Pentagon, 1-1/2 inches (38 mm) point to flat.
 - e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.
 - f. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

B. Wet-Barrel Fire Hydrants:

- 1. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, NPS 6 (DN 150) threaded or flanged inlet, and base section with NPS 6 (DN 150) mechanical-joint inlet. Include interior coating according to AWWA C550.
 - a. Standard: AWWA C503.
 - b. Pressure Rating: 150 psig (1035 kPa) minimum.

2. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, NPS 6 (DN 150) threaded or flanged inlet, and base section with NPS 6 (DN 150) mechanical-joint inlet.
 - a. Standards: UL 246 and FMG approved.
 - b. Pressure Rating: 150 psig (1035 kPa) minimum.
 - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
 - d. Operating and Cap Nuts: Pentagon, 1-1/2 inches (38 mm) point to flat.
 - e. Direction of Opening: Open hydrant valves by turning operating nut to left or counterclockwise.
 - f. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

2.27 FLUSHING HYDRANTS

A. Post-Type Flushing Hydrants:

1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. Outlet: One, with horizontal discharge.
 - c. Hose Thread: NPS 2-1/2 (DN 65), with NFPA 1963 external hose thread for use by local fire department, and with cast-iron cap with brass chain.
 - d. Barrel: Cast-iron or steel pipe with breakaway feature.
 - e. Valve: Bronze body with bronze-ball or plunger closure, and automatic draining.
 - f. Security: Locking device for padlock.
 - g. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.
 - h. Inlet: NPS 2 (DN 50) minimum.
 - i. Operating Wrench: One for each unit.

B. Ground-Type Flushing Hydrants:

1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. Outlet: One, with vertical angle; discharge.
 - c. Hose Thread: NPS 2-1/2 (DN 65), with NFPA 1963 external hose thread for use by local fire department, and with cast-iron cap with brass chain.
 - d. Barrel: Cast-iron or steel pipe.
 - e. Valve: Bronze body with bronze-ball or plunger closure, and automatic draining.
 - f. Inlet: NPS 2 (DN 50) minimum.
 - g. Hydrant Box: Cast iron with cover, for ground mounting.
 - h. Operating Wrench: One for each unit.

C. Post-Type Sampling Station:

1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.

- a. Pressure Rating: 100 psig (690 kPa) minimum.
- b. Sampling Outlet: One unthreaded nozzle with handle.
- c. Valve: Bronze body with bronze-ball or plunger closure. Include operating handle.
- d. Drain: Tubing with separate manual vacuum pump.
- e. Inlet: NPS 3/4 (DN 20) minimum.
- f. Housing: Weatherproof material with locking device. Include anchor device.
- g. Operating Wrench: One for each unit.

2.28 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

- 1. Description: Nonfreeze and drainable, of length required for shutoff valve installation below frost line.
 - a. Standard: UL 405.
 - b. Connections: Two NPS 2-1/2 (DN 65) inlets and one NPS 4 (DN 100); NPS 6 (DN 150); outlet.
 - c. Connections: Three, or Four; NPS 2-1/2 (DN 65) inlets and one NPS 6 (DN 150) outlet.
 - d. Connections: Six NPS 2-1/2 (DN 65) inlets and one NPS 6 (DN 150) outlet.
 - e. Inlet Alignment: Inline, horizontal.
 - f. Finish Including Sleeve: Polished bronze.
 - g. Escutcheon Plate Marking: (for applicable use)

2.29 ALARM DEVICES

- A. Alarm Devices, General: UL 753 and FMG approved, of types and sizes to mate and match piping and equipment.
- B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig (1725-kPa) working pressure; designed for horizontal or vertical installation; with 2 single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.
- C. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.
- D. Pressure Switches: Single pole, double throw; designed to signal increase in pressure.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.02 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 3 (DN 20 to DN 80); shall be any of the following:
 - 1. Soft copper tube, ASTM B 88, Type K, ASTM B 88M, Type A, ASTM B 88, Type L; ASTM B 88M, Type B; wrought-copper, solder-joint fittings; and brazed, copper, pressure-seal fittings; and pressure-sealed joints.
 - 2. PE, ASTM pipe; fittings for PE pipe; and clamped; molded PE fittings; and heat-fusion joints.
 - 3. PVC, Schedule 40 pipe, or Schedule 80 socket fittings; and solvent-cemented joints.
 - 4. NPS 1 to NPS 3 (DN 25 to DN 80) fiberglass, AWWA RTRP, Class 250; RTRF; and bonded joints.
 - 5. Fiberglass, AWWA RTRP, Class 250; RTRF; and bonded joints.
- F. Underground water-service piping NPS 4 to NPS 8 (DN 100 to DN 200); shall be any of the following:
 - 1. Soft copper tube, ASTM B 88, Type K; ASTM B 88M, Type A; ASTM B 88, Type L; ASTM B 88M, Type B; wrought-copper, solder-joint fittings; and brazed joints.
 - 2. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical; grooved-end pipe; ductile-iron-pipe appurtenances; and grooved; joints.
 - 3. PE, AWWA pipe; PE, AWWA fittings; and heat-fusion joints.
 - 4. PVC, Schedule 40 pipe; PVC, Schedule 40; 80 pipe; PVC, Schedule 80; socket fittings; and solvent-cemented joints.
 - 5. NPS 4 and NPS 6 (DN 100 and DN 150): NPS 6 (DN 150) PVC, AWWA Class 150 pipe; PVC, AWWA Class 150 fabricated; or molded; fittings; and gasketed joints.
 - 6. NPS 8 (DN 200): PVC, AWWA Class 200 pipe; PVC, AWWA Class 200 fabricated; push-on-joint, ductile-iron; mechanical-joint, ductile-iron; fittings; and gasketed joints.
 - 7. Fiberglass, AWWA RTRP, Class 150; 200; 250; RTRF; and bonded joints.
- G. Water Meter Box Water-Service Piping NPS 3/4 to NPS 2 (DN 20 to DN 50); shall be same as underground water-service piping.
- H. Aboveground and Vault; Water-Service Piping NPS 3/4 to NPS 3 (DN 20 to DN 80); shall be any of; the following:
 - 1. Hard copper tube, ASTM B 88, Type K (ASTM B 88M, Type A); ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and brazed; copper, pressure-seal fittings; and pressure-sealed; joints.
 - 2. PVC, Schedule 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented; threaded fittings; and threaded; joints.
 - 3. NPS 1 to NPS 2 (DN 25 to DN 50) fiberglass, AWWA RTRP, Class 150; 200; 250; RTRF; and bonded joints.
- I. Aboveground and vault; water-service piping NPS 4 to NPS 8 (DN 100 to DN 200); shall be any of; the following:

1. Hard copper tube, ASTM B 88, Type K (ASTM B 88M, Type A); ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and brazed joints.
 2. Ductile-iron, grooved-end pipe; ductile-iron, grooved-end appurtenances; and grooved joints.
 3. PVC, Schedule 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented; threaded fittings; and threaded; joints.
 4. Fiberglass, AWWA RTRP, Class 150; 200; 250; RTRF; and bonded joints.
- J. Underground Fire-Service-Main Piping NPS 4 to NPS 12 (DN 100 to DN 300); shall be any of; the following:
1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed; mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical; grooved-end pipe; ductile-iron-pipe appurtenances; and grooved; joints.
 2. PE, Class 150; 200, fire-service pipe; molded PE fittings; and heat-fusion joints.
 3. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.
 4. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 200 fabricated fittings; and gasketed joints.
 5. Fiberglass, AWWA, FMG-approved RTRP, Class 150; 200; RTRF; and gasketed joints.
 6. Fiberglass, UL RTRP, Class 150; 200; 250; RTRF; and gasketed joints.
- K. Aboveground and Vault; Fire-Service-Main Piping NPS 4 to NPS 12 (DN 100 to DN 300); shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.
- L. Underground Combined Water-Service and Fire-Service-Main Piping NPS 6 to NPS 12 (DN 150 to DN 300); shall be any of; the following:
1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed; mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical; grooved-end pipe; ductile-iron-pipe appurtenances; and grooved; joints.
 2. PVC, AWWA Class 150; 200; pipe listed for fire-protection service; PVC fabricated or molded fittings of same class as pipe; and gasketed joints.
 3. Fiberglass, AWWA, FMG-approved RTRP, Class 150; 200; RTRF; and gasketed joints.
- M. Aboveground and Vault; Combined Water Service and Fire-Service-Main Piping NPS 6 to NPS 12 (DN 150 to DN 300); shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.03 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Underground Valves, NPS 3 (DN 80) and Larger: AWWA, cast-iron, nonrising-stem, metal; resilient; high-pressure, resilient-seated gate valves with valve box.
 2. Underground Valves, NPS 4 (DN 100) and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
 3. Use the following for valves in vaults and aboveground:

- a. Gate Valves, NPS 2 (DN 50) and Smaller: Bronze, nonrising; rising; stem.
 - b. Gate Valves, NPS 3 (DN 80) and Larger: AWWA, cast iron, OS&Y rising stem, metal seated; AWWA, cast iron, OS&Y rising stem, resilient seated; UL/FMG, cast iron, OS&Y rising stem.
 - c. Check Valves: AWWA C508; UL/FMG; swing type.
- 4. Pressure-Reducing Valves: Use water-service piping in vaults and aboveground to control water pressure.
 - 5. Relief Valves: Use for water-service piping in vaults and aboveground.
 - a. Air-Release Valves: To release accumulated air.
 - b. Air/Vacuum Valves: To release or admit large volume of air during filling of piping.
 - c. Combination Air Valves: To release or admit air.
 - 6. Detector Check Valves: Use for water-service piping in vaults and aboveground to detect unauthorized use of water.

3.04 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. See Section 330500 "Common Work Results for Utilities" for piping-system common requirements.

3.05 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- C. Make connections larger than NPS 2 (DN 50) with tapping machine according to the following:
 - 1. Install tapping sleeve and tapping valve according to MSS SP-60.
 - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 - 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- D. Make connections NPS 2 (DN 50) and smaller with drilling machine according to the following:
 - 1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 - 2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 - 3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 - 4. Install corporation valves into service-saddle assemblies.
 - 5. Install manifold for multiple taps in water main.
 - 6. Install curb valve in water-service piping with head pointing up and with service box.

- E. Comply with NFPA 24 for fire-service-main piping materials and installation.
 - 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
 - 2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
 - 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
- G. Install PE pipe according to ASTM D 2774 and ASTM F 645.
- H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- I. Install fiberglass AWWA pipe according to AWWA M45.
- J. Bury piping with depth of cover over top at least 30 inches (750 mm); <Insert dimension>, with top at least 12 inches (300 mm); <Insert dimension> below level of maximum frost penetration, and according to the following:
 - 1. Under Driveways: With at least 36 inches (910 mm); <Insert dimension> cover over top.
 - 2. Under Railroad Tracks: With at least 48 inches (1220 mm); <Insert dimension> cover over top.
 - 3. In Loose Gravelly Soil and Rock: With at least 12 inches (300 mm); <Insert dimension> additional cover.
- K. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- L. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- M. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- N. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- O. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- P. See Section 211200 "Fire-Suppression Standpipes," Section 211313 "Wet-Pipe Sprinkler Systems," and Section 211316 "Dry-Pipe Sprinkler Systems" for fire-suppression-water piping inside the building.
- Q. See Section 221116 "Domestic Water Piping" for potable-water piping inside the building.

3.06 JOINT CONSTRUCTION

- A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

B. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
4. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
5. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
6. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
7. Fiberglass Piping Bonded Joints: Use adhesive and procedure recommended by piping manufacturer.
8. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 - a. Dielectric Fittings for NPS 2 (DN 50); <Insert pipe size> and Smaller: Use dielectric nipples; unions.
 - b. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100); Use dielectric flanges; flange kits; nipples.
 - c. Dielectric Fittings for NPS 5 (DN 125); <Insert pipe size> and Larger: Use dielectric flange kits.

3.07 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
1. Concrete thrust blocks.
 2. Locking mechanical joints.
 3. Set-screw mechanical retainer glands.
 4. Bolted flanged joints.
 5. Heat-fused joints.
 6. Pipe clamps and tie rods.
 7. <Insert devices.>
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.
 4. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.08 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.
- E. MSS Valves: Install as component of connected piping system.
- F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves.
- H. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.09 DETECTOR-CHECK VALVE INSTALLATION

- A. Install in vault or aboveground.
- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers

3.10 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.
- B. Water Meters: Install displacement; turbine-type water meters, NPS 2 (DN 50) and smaller, in meter boxes with shutoff valves on water meter inlets. Include valves on water meter outlets and valved bypass around meters unless prohibited by authorities having jurisdiction.
- C. Water Meters: Install compound; turbine-type water meters, NPS 3 (DN 80) and larger, in meter vaults. Include shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.
- D. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

3.11 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.12 VACUUM BREAKER ASSEMBLY INSTALLATION

- A. Install pressure vacuum breaker assemblies of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

- B. Do not install pressure vacuum breaker assemblies in vault or other space subject to flooding.

3.13 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 (DN 65) and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.14 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top 2 inches (50 mm); above surface.

3.15 CONCRETE VAULT INSTALLATION

- A. Install precast concrete vaults according to ASTM C 891.

3.16 PROTECTIVE ENCLOSURE INSTALLATION

- A. Install concrete base level and with top approximately 2 inches (50 mm); above grade.
- B. Install protective enclosure over valves and equipment.
- C. Anchor protective enclosure to concrete base.

3.17 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
- B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.
- C. AWWA Fire Hydrants: Comply with AWWA M17.
- D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.18 FLUSHING HYDRANT INSTALLATION

- A. Install post-type flushing hydrants with valve below frost line and provide for drainage. Support in upright position. Include separate gate valve or curb valve and restrained joints in supply piping.
- B. Install ground-type flushing hydrants with valve below frost line and provide for drainage. Install hydrant box flush with grade. Include separate gate valve or curb valve and restrained joints in supply piping.

- C. Install sampling stations with valve below frost line and provide for drainage. Attach weather-resistant housing and support in upright position. Include separate curb valve in supply piping.

3.19 FIRE DEPARTMENT CONNECTION INSTALLATION

- A. Install ball drip valves at each check valve for fire department connection to mains.
- B. Install protective pipe bollards on two sides each fire department connection. Pipe bollards are specified in Section 055000 "Metal Fabrications."

3.20 ALARM DEVICE INSTALLATION

- A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with valve box do not require supervision.
- B. Supervisory Switches: Supervise valves in open position.
 - 1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
 - 2. Indicator Posts: Drill and thread hole in upper-barrel section at target plate. Install switch, with toggle against target plate, on barrel of indicator post.
- C. Locking and Sealing: Secure unsupervised valves as follows:
 - 1. Valves: Install chain and padlock on open OS&Y gate valve.
 - 2. Post Indicators: Install padlock on wrench on indicator post.
- D. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.
- E. Water-Flow Indicators: Install in water-service piping in vault. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.
- F. Connect alarm devices to building fire alarm system. Wiring and fire-alarm devices are specified in Section 283111 "Digital, Addressable Fire-Alarm System" and Section 283112 "Zoned (DC Loop) Fire-Alarm System."

3.21 CONNECTIONS

- A. See Section 330500 "Common Work Results for Utilities" for piping connections to valves and equipment.
- B. Connect water-distribution piping to utility water main; existing water main. Use tapping sleeve and tapping valve; service clamp and corporation valve.
- C. Connect water-distribution piping to interior domestic water; and; fire-suppression; piping.
- D. Connect waste piping from concrete vault drains to sanitary sewerage system. See Section 221313 "Facility Sanitary Sewers" for connection to sanitary-sewer; storm-drainage system. See Section 334100 "Storm Utility Drainage Piping" for connection to storm-sewer; piping.
- E. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

- F. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.22 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

3.23 IDENTIFICATION

- A. Install continuous underground detectable; warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Section 330500 "Common Work Results for Utilities" for identifying devices.

3.24 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

10/31/2024
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City of Long Beach
Police Department Dispatch Communication Center
Including Locker Room / Bathroom Upgrade
1 West Chester Street, Long Beach, NY 11561
Ai-Alt File No. 23148.00

END OF SECTION

SECTION 22 13 13

FACILITY SANITY SEWERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:

1. Pipe and fittings.
2. Nonpressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.
6. Encasement for piping.
7. Manholes.

1.03 DEFINITIONS

- A. FRP: Fiberglass-reinforced plastic.

1.04 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Expansion joints and deflection fittings.
2. Backwater valves.

- B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

- B. Profile Drawings: Show system piping in elevation. Draw profiles to horizontal scale of not less than 1 inch equals 50 feet (1:500) and to vertical scale of not less than 1 inch equals 5 feet (1:50). Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.

- C. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

- D. Field quality-control reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions

1.07 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated"
 - 1. Notify Architect, Construction Manager, Landlord or Owner, no fewer than two (2) days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service Architect, Construction Manager, Landlord or Owner written permission.

PART 2 – PRODUCTS

2.01 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, [Service class] [Service and Extra-Heavy classes] [and] [Extra-Heavy class].
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.02 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. CISPI-Trademark, Shielded Couplings.
 - 1. Description: ASTM C 1277 and CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- C. Heavy-Duty, Shielded Couplings:
 - 1. Description: ASTM C 1277 and ASTM C 1540, with stainless-steel shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- D. Cast-Iron, Shielded Couplings:
 - 1. Description: ASTM C 1277 with ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- E. Unshielded Couplings:

1. Description: ASTM C 1277 and ASTM C 1461, rigid, sleeve-type, reducing- or transition-type mechanical coupling, with integral, center pipe stop, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.03 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

- A. Pipe: ASTM A 746, for push-on joints.
- B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.
- C. Compact Fittings: AWWA C153, ductile iron, for push-on joints.
- D. Gaskets: AWWA C111, rubber.

2.04 DUCTILE IRON, PRESSURE PIPE AND FITTINGS

- A. Push-on-Joint Piping:
 1. Pipe: AWWA C151.
 2. Standard Fittings: AWWA C110, ductile or gray iron.
 3. Compact Fittings: AWWA C153.
 4. Gaskets: AWWA C111, rubber, of shape matching pipe and fittings.
- B. Mechanical-Joint Piping:
 1. Pipe: AWWA C151, with bolt holes in bell.
 2. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
 3. Compact Fittings: AWWA C153, with bolt holes in bells.
 4. Glands: Cast or ductile iron; with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
 5. Gaskets: AWWA C111, rubber, of shape matching pipe, fittings, and glands.

2.05 ABS PIPE AND FITTINGS

- A. ABS Sewer Pipe and Fittings: ASTM D 2751, with bell-and-spigot ends for gasketed joints.
 1. NPS 3 to NPS 6 (DN 80 to DN 150): SDR 35.
 2. NPS 8 to NPS 12 (DN 200 to DN 300): SDR 42.
- B. Gaskets: ASTM F 477, elastomeric seals.

2.06 PVC PIPE AND FITTINGS

- A. PVC Cellular-Core Sewer Piping:
 1. Pipe: ASTM F 891, Sewer and Drain Series, PS 50 minimum stiffness, PVC cellular-core pipe with plain ends for solvent-cemented joints.
 2. Fittings: ASTM D 3034, [SDR 35] <Insert SDR>, PVC socket-type fittings.
- B. PVC Corrugated Sewer Piping:
 1. Pipe: ASTM F 949, PVC corrugated pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.

3. Gaskets: ASTM F 477, elastomeric seals.
- C. PVC Profile Sewer Piping:
 1. Pipe: ASTM F 794, PVC profile, gravity sewer pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: ASTM D 3034, PVC with bell ends.
 3. Gaskets: ASTM F 477, elastomeric seals.
- D. PVC Type PSM Sewer Piping:
 1. Pipe: ASTM D 3034, SDR 35 PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: ASTM D 3034, PVC with bell ends.
 3. Gaskets: ASTM F 477, elastomeric seals.
- E. PVC Gravity Sewer Piping:
 1. Pipe and Fittings: ASTM F 679, wall thickness, PVC gravity sewer pipe with bell-and-spigot ends and with integral ASTM F 477, elastomeric seals for gasketed joints.
- F. PVC Pressure Piping:
 1. Pipe: AWWA C900, Class 100, Class 150, and Class 200 PVC pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: AWWA C900, Class 100, Class 150, and Class 200 PVC pipe with bell ends.
 3. Gaskets: ASTM F 477, elastomeric seals.
- G. PVC Water Servicing Piping:
 1. Pipe: ASTM D 1785, Schedule 4, and/or Schedule 80 PVC, with plain ends for solvent-cemented joints.
 2. Fittings: ASTM D 2466, Schedule 40, and ASTM D 2467, Schedule 80 PVC, socket type.

2.07 CONCRETE PIPES AND FITTINGS

- A. Nonreinforced-Concrete Sewer Pipe and Fittings: ASTM C 14 (ASTM C 14M), Class 1, Class 2, or Class 3, with bell-and-spigot, or tongue-and-groove ends for gasketed joints with ASTM C 443 (ASTM C 443M), rubber gaskets.
- B. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M).
 1. Bell-and-spigot, or tongue-and-groove ends for gasketed joints, with ASTM C 443 (ASTM C 443M), rubber gaskets.
 2. Class II, Wall A, Wall B, or Wall C.
 3. Class III Wall A, Wall B, or Wall C.
 4. Class IV Wall A, Wall B, or Wall C.
 5. Class V, Wall A, or Wall B.

2.08 NON-PRESSURE TYPE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 - 1. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2. For Concrete Pipes: ASTM C 443 (ASTM C 443M), rubber.
 - 3. For Fiberglass Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 4. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 5. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings:
 - 1. Description: Elastomeric sleeve with[stainless-steel shear ring and] corrosion-resistant-metal tension band and tightening mechanism on each end.
- D. Shielded, Flexible Couplings:
 - 1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- E. Ring-Type, Flexible Couplings:
 - 1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.
- F. Nonpressure-Type, Rigid Couplings:
 - 1. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.09 PRESSURE-TYPE PIPE COUPLINGS

- A. Tubular-Sleeve Couplings: AWWA C219, with center sleeve, gaskets, end rings, and bolt fasteners.
- B. Metal, bolted, sleeve-type, reducing or transition coupling, for joining underground pressure piping. Include 150-psig (1035-kPa), or 200-psig (1380-kPa) minimum pressure rating and ends of same sizes as piping to be joined.
- C. Center-Sleeve Material Carbon steel, Stainless stee, Ductile iron, Malleable iron.
- D. Gasket Material: Natural or synthetic rubber.
- E. Metal Component Finish: Corrosion-resistant coating or material.

2.10 EXPANSION JOINTS AND DEFLECTION FITTINGS

- A. Ductile-Iron, Flexible Expansion Joints:

1. Description: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 250-psig (1725-kPa) minimum working pressure and for offset and expansion indicated.
- B. Ductile-Iron Expansion Joints:
 1. Description: Three-piece assembly of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for expansion indicated.
- C. Ductile-Iron Deflection Fittings:
 1. Description: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for up to 15 degrees of deflection.

2.11 BACKWATER VALVES

- A. Cast-Iron Backwater Valves:
 1. Description: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.
 2. Horizontal type; with swing check valve and hub-and-spigot ends.
 3. Combination horizontal and manual gate-valve type; with swing check valve, integral gate valve, and hub-and-spigot ends.
 4. Terminal type; with bronze seat, swing check valve, and hub inlet.
- B. PVC Backwater Valve
 1. Description: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

2.12 CLEANOUTS

- A. Cast-Iron Cleanouts:
 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 2. Top-Loading Classification(s): Light Duty, Medium Duty, Heavy Duty, or Extra-Heavy Duty.
 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
- B. PVC Cleanouts:
 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.13 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.

- B. Material: [Linear low-density polyethylene film of 0.008-inch (0.20-mm)] [or] [high-density, cross-laminated polyethylene film of 0.004-inch (0.10-mm)] minimum thickness.
- C. Form: Sheet, or tube.
- D. Color: [Black] [or] [natural] <Insert color>.

2.14 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches (1200 mm) minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
4. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
5. Riser Sections: 4-inch (100-mm) minimum thickness, of length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), cast or fitted into manhole walls, for each pipe connection.
9. Steps: [Individual FRP steps or FRP ladder] [Individual FRP steps, FRP ladder, or ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP] [ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP] <Insert material>; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to finished grade is less than [60 inches (1500 mm)] <Insert dimension>.
10. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Designed Precast Concrete Manholes:

1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
3. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
4. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), cast or fitted into manhole walls, for each pipe connection.
5. Steps: [Individual FRP steps or FRP ladder] [Individual FRP steps, FRP ladder, or ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP] [ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP] <Insert material>; wide enough to allow worker to place both feet on one

step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to finished grade is less than [60 inches (1500 mm)] <Insert dimension>.

6. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Fiberglass Manholes:

1. Description: ASTM D 3753.
2. Diameter: 48 inches (1200 mm) minimum unless otherwise indicated.
3. Ballast: Increase thickness of concrete base as required to prevent flotation.
4. Base Section: Concrete, 6-inch (150-mm) minimum thickness.
5. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), cast or fitted into manhole walls, for each pipe connection.
6. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to finished grade is less than [60 inches (1500 mm)] <Insert dimension>.
7. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
8. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

D. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch (610-mm) ID by 7- to 9-inch (175- to 225-mm) riser, with 4-inch-(100-mm-) minimum-width flange and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: [ASTM A 536, Grade 60-40-18 ductile] [ASTM A 48/A 48M, Class 35 gray] iron unless otherwise indicated.

E. Manhole-Cover Inserts:

1. Description: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.
2. Type: [Solid] [Drainage with vent holes] [Valve].

2.15 CONCRETE

- A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R (ACI 350M/350RM), and the following:
1. Cement: ASTM C 150, Type II.
 2. Fine Aggregate: ASTM C 33, sand.
 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 4. Water: Potable.

- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 1% - 2% through manhole.
 - 2. Benches: Concrete, sloped to drain into channel.
 - b. Slope: 4% - 8%.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.02 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of [1] [2] <Insert number> percent unless otherwise indicated.
2. Install piping [NPS 6 (DN 150)] <Insert value> and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install piping with 36-inch (915-mm), 48-inch (1220-mm), 60-inch (1520-mm), 72-inch (1830-mm)] minimum cover.
4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
5. Install hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
6. Install ductile-iron, gravity sewer piping according to ASTM A 746.
7. Install ABS sewer piping according to ASTM D 2321 and ASTM F 1668.
8. Install PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 1668.
9. Install PVC corrugated sewer piping according to ASTM D 2321 and ASTM F 1668.
10. Install PVC profile sewer piping according to ASTM D 2321 and ASTM F 1668.
11. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
12. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
13. Install fiberglass sewer piping according to ASTM D 3839 and ASTM F 1668.
14. Install nonreinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
15. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

G. Install force-main, pressure piping according to the following:

1. Install piping with restrained joints at tee fittings and at horizontal and vertical changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
2. Install piping with [36-inch (915-mm)] [48-inch (1220-mm)] [60-inch (1520-mm)] [72-inch (1830-mm)] <Insert dimension> minimum cover.
3. Install ductile-iron pressure piping according to AWWA C600 or AWWA M41.
4. Install ductile-iron special fittings according to AWWA C600.
5. Install PVC pressure piping according to AWWA M23 or to ASTM D 2774 and ASTM F 1668.
6. Install PVC water-service piping according to ASTM D 2774 and ASTM F 1668.

H. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:

1. Hub-and-spigot, cast-iron soil pipe.
 2. Hubless cast-iron soil pipe and fittings.
 3. Ductile-iron pipe and fittings.
 4. Expansion joints and deflection fittings.
- I. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.03 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure, drainage piping according to the following:

1. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
3. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
4. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
5. Join ABS sewer piping according to ASTM D 2321 and ASTM D 2751 for elastomeric-seal joints.
6. Join PVC cellular-core sewer piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
7. Join PVC corrugated sewer piping according to ASTM D 2321.
8. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
9. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
10. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
11. Join fiberglass sewer piping according to ASTM D 4161 for elastomeric-seal joints.
12. Join nonreinforced-concrete sewer piping according to ASTM C 14 (ASTM C 14M) and ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.
13. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.
14. Join dissimilar pipe materials with nonpressure-type, flexible[or rigid] couplings.

B. Join force-main, pressure piping according to the following:

1. Join ductile-iron pressure piping according to AWWA C600 or AWWA M41 for push-on joints.
2. Join ductile-iron special fittings according to AWWA C600 or AWWA M41 for push-on joints.
3. Join PVC pressure piping according to AWWA M23 for gasketed joints.
4. Join PVC water-service piping according to ASTM D 2855.
5. Join dissimilar pipe materials with pressure-type couplings.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
 - a. Shielded flexible, or rigid couplings for pipes of same or slightly different OD.
 - b. Unshielded, increaser/reducer-pattern, flexible, or rigid couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
2. Use pressure pipe couplings for force-main joints.

3.04 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.

- C. Install FRP manholes according to manufacturer's written instructions.
- D. Form continuous concrete channels and benches between inlets and outlet.
- E. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops [3 inches (76 mm)] <Insert dimension> above finished surface elsewhere unless otherwise indicated.
- F. Install manhole-cover inserts in frame and immediately below cover.

3.05 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.06 BACKWATER VALVE INSTALLATION

- A. Install horizontal-type backwater valves in piping manholes or pits.
- B. Install combination horizontal and manual gate valves in piping and in manholes.
- C. Install terminal-type backwater valves on end of piping and in manholes. Secure units to sidewalls.

3.07 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Light-Duty, top-loading classification cleanouts in [earth or unpaved foot-traffic] <Insert other> areas.
 - 2. Use Medium-Duty, top-loading classification cleanouts in [paved foot-traffic] <Insert other> areas.
 - 3. Use Heavy-Duty, top-loading classification cleanouts in [vehicle-traffic service] <Insert other> areas.
 - 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in [roads] <Insert area>.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18"x18"x12" (450x450x300 mm) deep. Set with tops 1 inch (25 mm) above surrounding grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.08 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch (150-mm) overlap with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN 100 to DN 500). Remove section of existing pipe, install wye fitting into existing piping, and encase

- entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
3. Make branch connections from side into existing piping, NPS 21 (DN 525) or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi (20.7 MPa) unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
 4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.09 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 1. Close open ends of piping with at least 8-inch (203-mm) thick, brick masonry bulkheads.
 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
 1. Remove manhole and close open ends of remaining piping.
 2. Remove top of manhole down to at least 36 inches (915 mm) below final grade. Fill to within 12 inches (300 mm) of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

3.10 IDENTIFICATION

- A. Comply with requirements in Section 31200 "Earth Moving" for underground utility identification devices. Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
 1. Use warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.11 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 1. Submit separate report for each system inspection.

2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 - a. Fill sewer piping with water. Test with pressure of at least 10-foot (3-m) head of water, and maintain such pressure without leakage for at least 15 minutes.
 - b. Close openings in system and fill with water.
 - c. Purge air and refill with water.
 - d. Disconnect water supply.
 - e. Test and inspect joints for leaks.
 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
 - b. Option: Test concrete gravity sewer piping according to ASTM C 924 (ASTM C 924M).
 7. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than 1-1/2 times the maximum system operating pressure, but not less than 150 psig (1035 kPa).
 - a. Ductile-Iron Piping: Test according to AWWA C600, "Hydraulic Testing" Section.
 - b. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
 8. Manholes: Perform hydraulic test according to ASTM C 969 (ASTM C 969M).
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

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Including Locker Room / Bathroom Upgrade
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3.12 CLEANING

- A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

END OF SECTION

SECTION 23 08 00

COMMISIONING OF HVAC SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes commissioning process requirements for the following HVAC system, assemblies, and equipment:

1. Toshiba Carrier Model Number: MMY-MAP0724HT9UL VRF Heat Pump System with rated capacities at Cooling: 69,000BTU/h and Heating: 77,000BTU/h with Inverter Twin Rotary compressor type powered at 208-230V, 3p, 60Hz.
2. The Heat Pump variable refrigerant flow system is a two-pipe system consisting of a single (or multiple) outdoor units of various types and capacities, individual or central indoor unit controls with on/off temperature settings, all connected by fully insulated refrigerant lines utilizing factory supplied branching kits.
3. Indoor units are connected to condensate piping that shall be terminated to the nearest drain point.
4. The system shall be fully capable of providing heating and cooling as requested by the individual indoor zones that can consist of single or multiple indoor units. The heating priority shall be default factory setting and can be changed to cooling, majority or a single zone priority.
7. Controls and instrumentation, including Building Management System (BMS)
8. Systems testing and balancing verification, of the VRF Heat Pump system and its entirety

- B. Related Requirements:

1. Section 019113 "General Commissioning Requirements" for general commissioning process requirements and Commissioning Coordinator responsibilities.

1.03 DEFINITIONS

- A. BMS: Building Management System.
- B. HVAC: Heating, Ventilation, and Air Conditioning
- C. "Systems," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- D. TAB: Testing, adjusting, and balancing.
- E. AHJ: Authority Having Jurisdiction

- F. NEBB: National Environmental Balancing Bureau
- G. AABC: Associated Air Balance Council

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For HVAC and BMS Testing Technician.
- B. Construction Checklists: See related Sections for technical requirements for the following construction checklists:
 1. Vibration and seismic controls for HVAC piping and equipment.
 2. Instrumentation and control for HVAC.
 3. Heating-water piping and accessories.
 4. Cooling-water piping and accessories.
 5. Steam and condensate piping and accessories.
 6. Refrigerant piping.
 7. Metal ducts and accessories.
 8. Fans.
 9. Particulate air filtration.

1.05 QUALITY ASSURANCE

- A. Units shall be listed by ETL (Engineering Testing Laboratory) and be evaluated in accordance with UL standard 1995, 4th edition.
- B. Unit shall be listed in the AHRI directory.
- C. All units shall meet the Federal minimum efficiency standards and be tested per AHRI 1230 standard.
- D. BMS Testing Technician Qualifications: Technicians to perform BMS construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:
 1. Journey-level or equivalent skill level with knowledge of BMS, HVAC, electrical concepts, and building operations.
 2. Minimum three years recent experience installing, servicing, and operating systems manufactured by approved manufacturer.
 3. International Society of Automation (ISA) Certified Control Systems Technician (CCST) Level I.
- E. HVAC Testing Technician Qualifications: Technicians to perform HVAC construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:
 1. Journey-level or equivalent skill level. Vocational School four-year program graduate or an associate's degree in mechanical systems, air conditioning, or similar field. Degree may be offset by three years' experience in servicing mechanical systems in the HVAC industry. Generally, required knowledge includes HVAC systems, electrical concepts, building operations, and application and use of tools and instrumentation to measure performance of HVAC equipment, assemblies, and systems.
 2. Minimum three years recent experience installing, servicing, and operating systems manufactured by approved manufacturer.

3. One of the following:
- National Environmental Balancing Bureau (NEBB) Certified Testing, Adjusting, and Balancing Technician.
 - Associated Air Balance Council (AABC) Certified Test and Balance Technician.
 - Owner retains the right to waive NEBB or AABC Certification.
- F. Testing Equipment and Instrumentation Quality and Calibration: For test equipment and instrumentation required to perform HVAC commissioning work, perform the following:
- Submit test equipment and instrumentation list. For each equipment or instrument, identify the following:
 - Equipment/instrument identification number.
 - Planned commissioning application or use.
 - Manufacturer, make, model, and serial number.
 - Calibration history, including certificates from agencies that calibrate the equipment and instrumentation.
 - Test equipment and instrumentation shall meet the following criteria:
 - Capable of testing and measuring performance within the specified acceptance criteria.
 - Be calibrated at the manufacturer's recommended intervals with current calibration tags permanently affixed to the instrument being used.
 - Be maintained in good repair and operating condition throughout the duration of use on this Project.
 - Be recalibrated/repaired if dropped or damaged in any way since last calibrated.
- G. Proprietary Test Instrumentation and Tools:
- Equipment Manufacturer's Proprietary Instrumentation and Tools: For installed equipment included in the commissioning process, test instrumentation and tools manufactured or prescribed by equipment manufacturer to service, calibrate, adjust, repair, or otherwise work on its equipment or required as a condition of equipment warranty, perform the following:
 - Submit proprietary instrumentation and tools list. For each instrument or tool, identify the following:
 - Instrument or tool identification number.
 - Equipment schedule designation of equipment for which the instrument or tool is required.
 - Manufacturer, make, model, and serial number.
 - Calibration history, including certificates from agencies that calibrate the instrument or tool, where appropriate.
 - Include a separate list of proprietary test instrumentation and tools in the operation and maintenance manuals.
 - HVAC proprietary test instrumentation and tools become the property of Owner at the time of Substantial Completion.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. General: Factory-assembled, single piece air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the multiple inverter-driven twin rotary compressors.
 - 1. The maximum sound pressure rating for a single module shall not exceed 64 dBA sound pressure in cooling and 65 dBA in heating and for multiple modular systems the sound pressure numbers should not exceed 68 dBA and 69 dBA. Sound pressure ratings are measured at a distance of 3 ft out and 4 ½ ft up from the side of the outdoor unit.
 - 2. The outdoor unit shall include an oversized accumulator and a liquid tank for proper heating performance while allowing the indoor unit PMV (pulse modulating valve) metering device to shut off completely when a zone is satisfied.
 - 3. The outdoor unit shall be protected by a high-pressure switch, high-pressure sensor, low-pressure sensor, fusible plug, PC board, and inverter overload protector.
 - 4. The outdoor unit shall be capable of operating in cooling mode down to 14F ambient air temperature and down to -13 F wet bulb ambient air temperature in heating.
 - 5. The outdoor unit shall include a total oil management system that balances oil between compressors within a module, replenishes compressor oil to the compressors in a module from the oil separator if required, and allows oil and refrigerant to move between multiple modular units if required, even if one of the units is not running.
- B. Unit Cabinet:
 - 1. Unit cabinet shall be constructed of pre-coated steel, finished on both inside and outside.
 - 2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressors, fan, and control components.
 - 3. Compressors shall be isolated in a compartment and have an acoustic wrap to assure quiet operation.
 - 4. The outdoor unit control panel shall include a sliding window to access adjustable controls and an LED display for setup and diagnostics.
 - 5. Unit cabinet shall be capable of withstanding 500-hour salt spray test per Federal Test Standard No. 141 (method 6061).
- C. Fans:
 - 1. Outdoor fan shall discharge air vertically and be driven by a DC inverter variable speed motor with 64 steps that can run down to 60 rpm.
 - 2. The outdoor fan motor shall be totally enclosed with permanently lubricated bearings.
 - 3. Motor shall be protected by internal thermal overload protection.
 - 4. Fan blades shall be non-metallic and shall be statically and dynamically balanced.
 - 5. Outdoor fan shall be protected by a raised nonmetallic protective grille.
- D. Compressors:
 - 1. Each outdoor unit module shall be equipped with two inverter-driven twin rotary compressors with full range control to an accuracy of ±0.1 Hz.
 - 2. The compressor shall be totally enclosed in the machine compartment.
 - 3. Compressors shall be equipped with factory mounted crankcase heaters.
 - 4. Internal overloads shall protect the compressor from over-temperature operation.

5. Motor shall be suitable for operation in an R-410A refrigerant atmosphere.
6. Compressor assembly shall be installed on rubber vibration isolators.
7. To maximize compressor reliability, multiple compressors within a module shall be started and operated in variable patterns to ensure equal run time on all compressors.
8. To ensure maximum efficiency throughout the system operation range, no compressor is required to run at maximum speed under any condition.

E. Outdoor Coil:

1. Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.
2. The coil configuration shall be 4-sided and fully separated from the machine compartment for more effective heat transfer and sound isolation.
3. The coil fins shall have a factory-applied corrosion resistant blue-fin finish.

F. Controls and Safeties: Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

1. Controls:
 - a. Compressor speed to match the refrigerant flow and capacity with the system requirements.
 - b. Outdoor fan motor speed for higher efficiency and lower sound.
 - c. Oil control for improved system reliability and comfort
 - d. Pulse modulating valve control for precise control of the refrigerant distribution and accurate capacity management to avoid starving any units.
 - e. Control of compressor staging to maximize reliability and minimum run time on all compressors.
 - f. Module control of compressor operation, compressor speed, and outdoor heat exchanger surface to maximize efficiency and sound level and reliability across the entire operating range of the system.
 - g. Control of the outdoor heat exchanger surface (main vs sub heat exchangers) for maximum efficiency and comfort.
2. Safeties: The following safety devices shall be part of the condensing unit:
 - a. High-pressure switch
 - b. Fuses
 - c. Crankcase heater
 - d. Fusible plug
 - e. Overcurrent relay for the compressor
 - f. Thermal protectors for compressor and fan motor
 - g. Compressor time delay
 - h. Oil recovery system
 - i. Oil level sensor
 - j. Overcurrent sensor
 - k. Compressor suction and discharge temperature sensor
 - l. Compressor suction and discharge pressure sensor

G. Electrical Requirements:

1. All sizes shall utilize 208/230-3-60 or 460-3-60 (V-Ph-Hz) field power supply.
2. Multiple systems shall have separate field power supply to each module.

3. Two-core, standard, shielded low voltage cable shall be required for communication between outdoor and indoor unit.
4. All power and control wiring must be installed per NEC and all local electrical codes.

H. Refrigerant Piping and Line Lengths:

1. Piping connections shall be from the front or the bottom of the unit. The unit shall be capable of operating with maximum connected refrigerant line lengths up to 3281 (ft) actual based on total system capacity and refrigerant amount.
2. The outdoor unit shall have the ability to operate with a maximum height of 230 ft between the outdoor and the lowest indoor unit.
3. The maximum distance between the outdoor unit and the furthest fan coil shall not exceed 623 ft actual or 771 ft equivalent. No line size changes or oil traps shall be required.
4. The system shall be capable of operating when the height difference between the upper and the lower fan coil is 131 ft.

I. Auxiliary Refrigerant Components:

1. All field-supplied copper tubing connecting the outdoor unit to the indoor unit shall use factory-supplied branching kits consisting of either Y joints or headers to ensure even refrigerant flow.
2. To ensure piping flexibility, the system shall allow having Y joints or headers downstream of another header.
3. When combining multiple modules, and in order to maximize efficiency and comfort, a 3/8-in. oil balance line shall be used to allow the flow oil and refrigerant between the two units, even when one of the units is not running.

PART 3 – EXECUTION

3.01 GENERAL TESTING REQUIREMENTS

- A. Certify that HVAC systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents and approved Shop Drawings and submittals.
- B. Certify that HVAC instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents and approved Shop Drawings and submittals, and that pretest set points have been recorded.
- C. Certify that TAB procedures have been completed and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested according to approved test procedures (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Measure capacities and effectiveness of systems, assemblies, subsystems, equipment, and components, including operational and control functions to verify compliance with acceptance criteria.
- F. Test systems, assemblies, subsystems, equipment, and components operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and response according to acceptance criteria.

- G. Construction Checklists: Prepare and submit detailed construction checklists for HVAC systems, subsystems, equipment, and components.
4. Contributors to the development of construction checklists shall include, but are not limited to, the following:
- a. HVAC systems and equipment installers.
 - b. TAB technicians.
 - c. HVAC instrumentation and controls installers.
- H. Perform tests using design conditions, whenever possible.
1. Simulated conditions may, with approval of Architect, be imposed using an artificial load when it is impractical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by Commissioning Coordinator and document simulated conditions and methods of simulation. After tests, return configurations and settings to normal operating conditions.
 2. Commissioning test procedures may direct that set points be altered when simulating conditions is impractical.
 3. Commissioning test procedures may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are impractical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC system, document the deficiency and report it to Owner. After deficiencies are resolved, reschedule tests.
- J. If seasonal testing is specified, complete appropriate initial performance tests and documentation and schedule seasonal tests.
- K. Coordinate schedule with, and perform the following activities at the direction of, Commissioning Coordinator.
- L. Comply with construction checklist requirements, including material verification, installation checks, start-up, and performance tests requirements specified in Sections specifying HVAC systems and equipment.
- M. Provide technicians, instrumentation, tools, and equipment to complete and document the following:
1. Performance tests.
 2. Demonstration of a sample of performance tests.
 3. Commissioning tests.
 4. Commissioning test demonstrations.

3.02 TAB COMMISIONING TESTS

- A. TAB Verification:
1. Prerequisites: Completion of "Examination" Article requirements and correction of deficiencies, as specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC."
 2. Completion of "Preparation" Article requirements for preparation of a TAB plan that includes strategies and step-by-step procedures, and system-readiness checks and reports, as specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC."
 3. Scope: HVAC air systems and hydronic piping systems.

4. Purpose: Differential flow relationships intended to maintain air pressurization differentials between the various areas of Project.
5. Conditions of the Test:
 - a. Commissioning Test Demonstration Sampling Rate: As specified in "Inspections" Article in Section 230593 "Testing, Adjusting, and Balancing for HVAC."
 - b. Systems operating in full heating mode with minimum outside-air volume as specified by equipment manufacturer data sheet.
 - c. Systems operating in full cooling mode with minimum outside-air volume as specified by equipment manufacturer data sheet.
 - d. For measurements at air-handling units with economizer controls; systems operating in economizer mode with 100 percent outside air.
6. Acceptance Criteria:
 - a. Under all conditions, rechecked measurements comply with "Inspections" Article in Section 230593 "Testing, Adjusting, and Balancing for HVAC."
 - b. Additionally, no rechecked measurement shall differ from measurements documented in the final report by more than two times the tolerances allowed.
 - c. Under all conditions, where the Contract Documents indicate a differential in airflow between supply and exhaust and/or return in a space, the differential relationship shall be maintained.

3.03 PRE-FUNCTIONAL CHECKLISTS

- A. The Contractor shall complete the Pre-functional Checklists to verify systems, subsystems, and equipment installation, is complete and systems are ready for Systems Functional Performance Testing
 1. Secure checklists as prescribed by equipment manufacturer to be used to document equipment installation. The Contractor shall complete these checklists accordingly.
 2. Completed checklists shall be submitted to AHJ, and/or to the Commissioning Agent (if needed) for review. If it is determined that the information provided in the checklist is not accurate, and/or insufficient, it shall be returned with the marked-up Checklist to the Contractor for correction and resubmission.

3.04 SYSTEMS FUNCTIONAL PERFORMANCE TESTING

- A. The commissioning process includes Systems Functional Performance Testing that is intended to test system functional performance under steady state conditions, to test the system's reaction to changing operating conditions, and system performance under emergency conditions.
 1. The Contractor shall secure the detailed performance test forms and procedures as prescribed by the equipment manufacturer. These forms and procedures shall be reviewed by the AHJ and/or by the Commissioning Agent (if needed) prior to the tests.
 2. The Contractor shall provide the required labor, materials, and testing equipment identified in the test procedure to perform the test.
 3. Authorized representatives shall witness and document the testing and will sign (together with the Contractor) the test reports to verify tests were performed.

3.05 TRAINING OF PERSONNEL

- A. Training of operation and maintenance personnel is required in cooperation with the Contractor and Equipment supplier/manufacturer.
1. Provide competent, factory authorized technician to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems.
 2. Contractor shall submit training agendas and trainer resumes in accordance with the requirements of Sec 01 91 00. The instruction shall be scheduled in coordination with the Contractor after submission and approval of formal training plans.

END OF SECTION

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**SECTION 26 05 11
REQUIREMENTS FOR ELECTRICAL INSTALLATION**

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section applies to all sections of Division 26.
- B. Furnish and install electrical systems, materials, equipment, and accessories in accordance with the specifications and drawings.
- C. Capacities and ratings of motors, transformers, conductors and cable, switchboards, switchgear, panelboards and other items and arrangements for the specified items are shown on the drawings. Electrical service entrance equipment and arrangements for temporary and permanent connections to the electric utility company's system shall conform to the electric utility company's requirements. Coordinate fuses, circuit breakers and relays with the electric utility company's system and obtain electric utility company approval for sizes and settings of these devices.
- D. Conductor ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways sized per NEC. Aluminum conductors are prohibited.

1.2 MINIMUM REQUIREMENTS

- A. The latest International Building Code (IBC), Underwriters Laboratories, Inc. (UL), Institute of Electrical and Electronics Engineers (IEEE), and National Fire Protection Association (NFPA) codes and standards are the minimum requirements for materials and installation.
- B. The drawings and specifications shall govern in those instances where requirements are greater than those stated in the above codes and standards.

1.3 TEST STANDARDS

- A. All materials and equipment shall be listed, labeled, or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc. (UL) standards where test standards have been established. Materials and equipment which are not covered by UL standards will be accepted, providing that materials and equipment are listed, labeled, certified or otherwise determined to meet the safety requirements of a NRTL. Materials and equipment which no NRTL accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as ANSI, NEMA, and NETA. Evidence of compliance shall include certified test reports and definitive shop drawings.
- B. Definitions:
 - 1. Listed: Materials and equipment included in a list published by an organization that is acceptable to the Authority Having Jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production or listed materials and equipment or periodic evaluation of services, and whose listing states that the materials and equipment either meets appropriate designated standards or has been tested and found suitable for a specified purpose.

2. Labeled: Materials and equipment to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the Authority Having Jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled materials and equipment, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
3. Certified: Materials and equipment which:
 - a. Have been tested and found by a NRTL to meet nationally recognized standards or to be safe for use in a specified manner.
 - b. Are periodically inspected by a NRTL.
 - c. Bear a label, tag, or other record of certification.
4. Nationally Recognized Testing Laboratory: Testing laboratory which is recognized and approved by the Secretary of Labor in accordance with OSHA regulations.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

- A. Manufacturer's Qualifications: The manufacturer shall regularly and currently produce, as one of the manufacturer's principal products, the materials and equipment specified for this project, and shall have manufactured the materials and equipment for at least three years.
- B. Product Qualification:
 1. Manufacturer's materials and equipment shall have been in satisfactory operation, on three installations of similar size and type as this project, for at least three years.
 2. The Government reserves the right to require the Contractor to submit a list of installations where the materials and equipment have been in operation before approval.
- C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within four hours of receipt of notification that service is needed. Submit name and address of service organizations.

1.5 APPLICABLE PUBLICATIONS

- A. Applicable publications listed in all Sections of Division 26 shall be the latest issue, unless otherwise noted.
- B. Products specified in all sections of Division 26 shall comply with the applicable publications listed in each section.

1.6 MANUFACTURED PRODUCTS

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, and for which replacement parts shall be available. Materials and equipment furnished shall be new and shall have superior quality and freshness.
- B. When more than one unit of the same class or type of materials and equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer.
 2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
 3. Components shall be compatible with each other and with the total assembly for the intended service.
 4. Constituent parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring and terminals shall be identified on the equipment being furnished and on all wiring diagrams.
- E. When Factory Tests are specified, Factory Tests shall be performed in the factory by the equipment manufacturer and witnessed by the contractor. In addition, the following requirements shall be complied with:
1. The Government shall have the option of witnessing factory tests. The Contractor shall notify the Government through the COR a minimum of thirty (30) days prior to the manufacturer's performing of the factory tests.
 2. When factory tests are successful, contractor shall furnish four (4) copies of the equipment manufacturer's certified test reports to the COR fourteen (14) days prior to shipment of the equipment, and not more than ninety (90) days after completion of the factory tests.
 3. When Factory tests are not successful, factory tests shall be repeated in the factory by the equipment manufacturer and witnessed by the Contractor. The Contractor shall be liable for all additional expenses for the Government to witness factory re-testing.

1.7 VARIATIONS FROM CONTRACT REQUIREMENTS

- A. Where the Government or the Contractor requests variations from the contract requirements, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.8 MATERIALS AND EQUIPMENT PROTECTION

- A. Materials and equipment shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
1. Store materials and equipment indoors in clean dry space with uniform temperature to prevent condensation.
 2. During installation, equipment shall be protected against entry of foreign matter, and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
 3. Damaged equipment shall be repaired or replaced, as determined by the COR.
4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
5. Damaged paint on equipment shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.9 WORK PERFORMANCE

- A. All electrical work shall comply with requirements of the latest NFPA 70 (NEC), NFPA 70B, NFPA 70E, NFPA 99, NFPA 110, OSHA Part 1910 subpart J – General

Environmental Controls, OSHA Part 1910 subpart K – Medical and First Aid, and OSHA Part 1910 subpart S – Electrical, in addition to other references required by contract.

- B. Job site safety and worker safety is the responsibility of the Contractor.
- C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. However, energized electrical work may be performed only for the non-destructive and non-invasive diagnostic testing(s), or when scheduled outage poses an imminent hazard to patient care, safety, or physical security. In such case, all aspects of energized electrical work, such as the availability of appropriate/correct personal protective equipment (PPE) and the use of PPE, shall comply with the latest NFPA 70E, as well as the following requirements:
 - 1. Only Qualified Person(s) shall perform energized electrical work. Supervisor of Qualified Person(s) shall witness the work of its entirety to ensure compliance with safety requirements and approved work plan.
 - 2. At least two weeks before initiating any energized electrical work, the Contractor and the Qualified Person(s) who is designated to perform the work shall visually inspect, verify and confirm that the work area and electrical equipment can safely accommodate the work involved.
 - 3. At least two weeks before initiating any energized electrical work, the Contractor shall develop and submit a job specific work plan, and energized electrical work request to the COR, and Medical Center's Chief Engineer or his/her designee. At the minimum, the work plan must include relevant information such as proposed work schedule, area of work, description of work, name(s) of Supervisor and Qualified Person(s) performing the work, equipment to be used, procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used, and exit pathways.
 - 4. Energized electrical work shall begin only after the Contractor has obtained written approval of the work plan, and the energized electrical work request from the COR, and Medical Center's Chief Engineer or his/her designee. The Contractor shall make these approved documents present and available at the time and place of energized electrical work.
 - 5. Energized electrical work shall begin only after the Contractor has invited and received acknowledgment from the COR, and Medical Center's Chief Engineer or his/her designee to witness the work.
- D. For work that affects existing electrical systems, arrange, phase and perform work to assure minimal interference with normal functioning of the facility. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01 00 00, GENERAL REQUIREMENTS.
- E. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Section 01 00 00, GENERAL REQUIREMENTS.
- F. Coordinate location of equipment and conduit with other trades to minimize interference.

1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS

- A. Equipment location shall be as close as practical to locations shown on the drawings.
- B. Working clearances shall not be less than specified in the NEC.
- C. Inaccessible Equipment:

1. Where the Government determines that the Contractor has installed equipment not readily accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Government.
2. "Readily accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.
- D. Electrical service entrance equipment and arrangements for temporary and permanent connections to the electric utility company's system shall conform to the electric utility company's requirements. Coordinate fuses, circuit breakers and relays with the electric utility company's system and obtain electric utility company approval for sizes and settings of these devices.

1.11 EQUIPMENT IDENTIFICATION

- A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as switchboards and switchgear, panelboards, cabinets, motor controllers, fused and non-fused safety switches, generators, automatic transfer switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.
- B. Identification signs for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Identification signs for Essential Electrical System (EES) equipment, as defined in the NEC, shall be laminated red phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 12 mm (1/2 inch) high. Identification signs shall indicate equipment designation, rated bus amperage, voltage, number of phases, number of wires, and type of EES power branch as applicable. Secure nameplates with screws.
- C. Install adhesive arc flash warning labels on all equipment as required by the latest NFPA 70E. Label shall show specific and correct information for specific equipment based on its arc flash calculations. Label shall show the followings:
 1. Nominal system voltage.
 2. Equipment/bus name, date prepared, and manufacturer name and address.
 3. Arc flash boundary.
 4. Available arc flash incident energy and the corresponding working distance.
 5. Minimum arc rating of clothing.
 6. Site-specific level of PPE.

1.12 SUBMITTALS

- A. Submit to the COR in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. The Government's approval shall be obtained for all materials and equipment before delivery to the job site. Delivery, storage or installation of materials and equipment which has not had prior approval will not be permitted.
- C. All submittals shall include six copies of adequate descriptive literature, catalog cuts, shop drawings, test reports, certifications, samples, and other data necessary for the Government to ascertain that the proposed materials and equipment comply with drawing and specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify specific

materials and equipment being submitted.

D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION_____".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, manuals, pictures, nameplate data, and test reports as required.
2. Submittals are required for all equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion, etc.) associated with equipment or piping so that the proposed installation can be properly reviewed. Include sufficient fabrication information so that appropriate mounting and securing provisions may be designed and attached to the equipment.
3. Elementary and interconnection wiring diagrams for communication and signal systems, control systems, and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
4. Parts list which shall include information for replacement parts and ordering instructions, as recommended by the equipment manufacturer.

F. Maintenance and Operation Manuals:

1. Submit as required for systems and equipment specified in the technical sections. Furnish in hardcover binders or an approved equivalent.
2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, material, equipment, building, name of Contractor, and contract name and number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the material or equipment.
3. Provide a table of contents and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manuals shall include:
 - a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
 - b. A control sequence describing start-up, operation, and shutdown.
 - c. Description of the function of each principal item of equipment.
 - d. Installation instructions.
 - e. Safety precautions for operation and maintenance.
 - f. Diagrams and illustrations.
 - g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers.
 - h. Performance data.

- i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare and replacement parts, and name of servicing organization.
 - j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.
- G. Approvals will be based on complete submission of shop drawings, manuals, test reports, certifications, and samples as applicable.
- H. After approval and prior to installation, furnish the COR with one sample of each of the following:
- 1. A minimum 300 mm (12 inches) length of each type and size of wire and cable along with the tag from the coils or reels from which the sample was taken. The length of the sample shall be sufficient to show all markings provided by the manufacturer.
 - 2. Each type of conduit coupling, bushing, and termination fitting.
 - 3. Conduit hangers, clamps, and supports.
 - 4. Duct sealing compound.
 - 5. Each type of receptacle, toggle switch, lighting control sensor, outlet box, manual motor starter, device wall plate, engraved nameplate, wire, and cable splicing and terminating material, and branch circuit single pole molded case circuit breaker.

1.13 SINGULAR NUMBER

- A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

1.14 ACCEPTANCE CHECKS AND TESTS

- A. The Contractor shall furnish the instruments, materials, and labor for tests.
- B. Where systems are comprised of components specified in more than one section of Division 26, the Contractor shall coordinate the installation, testing, and adjustment of all components between various manufacturer's representatives and technicians so that a complete, functional, and operational system is delivered to the Government.
- C. When test results indicate any defects, the Contractor shall repair or replace the defective materials or equipment, and repeat the tests for the equipment. Repair, replacement, and re-testing shall be accomplished at no additional cost to the Government.

1.15 WARRANTY

- A. All work performed, and all equipment and material furnished under this Division shall be free from defects and shall remain so for a period of one year from the date of acceptance of the entire installation by the Contracting Officer for the Government.

1.16 INSTRUCTION

- A. Instruction to designated Government personnel shall be provided for the particular equipment or system as required in each associated technical specification section.
- B. Furnish the services of competent and factory-trained instructors to give full instruction in the adjustment, operation, and maintenance of the specified equipment and system, including pertinent safety requirements. Instructors shall be thoroughly familiar with all aspects of the installation and shall be factory-trained in operating theory as well as practical operation and

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maintenance procedures.

- C. A training schedule shall be developed and submitted by the Contractor and approved by the COR at least 30 days prior to the planned training.

PART 2 - PRODUCTS (NOT USED)
PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, connection, and testing of the electrical conductors and cables for use in electrical systems rated 600 V and below, indicated as cable(s), conductor(s), wire, or wiring in this section.

1.2 RELATED WORK

- A. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire-resistant rated construction.
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.
- C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- D. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits for conductors and cables.
- E. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Installation of conductors and cables in manholes and ducts.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:
 1. Shop Drawings:
 - a. Submit Sufficient information to demonstrate compliance with drawings and specifications.
 - b. Submit the following data for approval:
 - 1.) Electrical ratings and insulation type for each conductor and cable.
 - 2.) Splicing materials and pulling lubricant.

2. Certifications: Two weeks prior to final inspection, submit the following:
 - a. Certification by the manufacturer that the conductors and cables conform to the requirements of the drawings and specifications.
 - b. Certification by the contractor that the conductors and cables have been properly installed, adjusted, and tested.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including, amendments, addenda, revisions, supplements and errata) for a part of this specification to the extent referenced. Publications are reference in the text by designation only.
- B. American Society of Testing Material (ASTM):
 1. D2301-10 Standard Specification for Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape
 2. D2304-10 Test Method for Thermal Endurance of Rigid Electrical Insulating Materials
 3. D3005-10 Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape
- C. National Electrical Manufacturers Association (NEMA):
 1. WC 70-09 Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- D. National Fire Protection Association (NFPA):
 1. 70-17 National Electrical Code (NEC)
- E. Underwriters Laboratories, Inc. (UL):
 1. 44-14 Thermoset-Insulated Wires and Cables
 2. 83-14 Thermoplastic-Insulated Wires and Cables
 3. 467-13 Grounding and Bonding Equipment
 4. 486A-486B-13 Wire Connectors
 5. 486C-13 Splicing Wire Connectors
 6. 486D-15 Sealed Wire Connector Systems
 7. 486E-15 Equipment Wiring Terminats for Use with Aluminum and/or Copper Conductors
 8. 493-07 Thermoplastic-Insulated Underground Feeder and Brance Circuit \ Cables
 9. 514B-12 Conduit, Tubing, and Cable Fittings

PART 2 – PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Conductors and cables shall be in accordance with ASTM, NEMA, NFPA, UL, as specified herein, and as shown on the drawings.

- B. All conductors shall be copper.
- C. Single Conductor and Cable:
 - 1. No. 12 AWG: Minimum size, except where smaller sizes are specified herein or shown on the drawings.
 - 2. No. 8 AWG and larger: Stranded.
 - 3. No. 10 AWG and smaller: Solid; except shall be stranded for final connection to motors, transformers, and vibrating equipment.
 - 4. Insulation: THHN-THWN and XHHW-2. XHHW-2 shall be used for isolated power systems.

2.2 SPLICES

- A. Splices shall be in accordance with NEC and UL.
- B. Above Ground Splices for No. 10 AWG and Smaller:
 - 1. Solderless, screw-on, reusable pressure cable type, with integral insulation, approved for copper and aluminum conductors.
 - 2. The integral insulator shall have a skirt to completely cover the stripped conductors.
 - 3. The number, size, and combination of conductors used with the connector, as listed on the manufacturer's packaging, shall be strictly followed.
- C. Above Ground Splices for No. 8 AWG to No. 4/0 AWG:
 - 1. Compression, hex screw, or bolt clamp-type of high conductivity and corrosion-resistant material, listed for use with copper and aluminum conductors.
 - 2. Insulate with materials approved for the particular use, location, voltage, and temperature. Insulation level shall be not less than the insulation level of the conductors being joined.
 - 3. Splice and insulation shall be product of the same manufacturer.
 - 4. All bolts, nuts, and washers used with splices shall be zinc-plated steel.
- D. Above Ground Splices for 250 kcmil and Larger:
 - 1. Long barrel "butt-splice" or "sleeve" type compression connectors, with minimum of two compression indents per wire, listed for use with copper and aluminum conductors.
 - 2. Insulate with materials approved for the particular use, location, voltage, and temperature. Insulation level shall be not less than the insulation level of the conductors being joined.
 - 3. Splice and insulation shall be product of the same manufacturer.

2.3 CONNECTORS AND TERMINATIONS

- A. Mechanical type of high conductivity and corrosion-resistant material, listed for use with copper and aluminum conductors.
- B. Long barrel compression type of high conductivity and corrosion-resistant material, with minimum of two compression indents per wire, listed for use with copper and aluminum conductors.
- C. All bolts, nuts, and washers used to connect connections and terminations to bus bars or

other termination points shall be zinc- plated steel.

2.4 CONTROL WIRING

- A. Unless otherwise specified elsewhere in these specifications, control wiring shall be as specified herein, except that the minimum size shall be not less than No. 14 AWG.
- B. Control wiring shall be sized such that the voltage drop under in-rush conditions does not adversely affect operation of the controls.

2.5 WIRE LUBRICATING COMPOUND

- A. Lubricating compound shall be suitable for the wire insulation and conduit and shall not harden or become adhesive.
- B. Shall not be used on conductors for isolated power systems.

PART 3 – EXECUTION

3.1 GENERAL

- A. Installation shall be in accordance with the NEC, as shown on the drawings, and manufacturer's instructions.
- B. Install all conductors in raceway systems.
- C. Splice conductors only in outlet boxes, junction boxes, pull boxes, manholes, or handholes.
- D. Conductors of different systems (e.g., 120 V and 277 V) shall not be installed in the same raceway.
- E. Install cable supports for all vertical feeders in accordance with the NEC. Provide split wedge type which firmly clamps each individual cable and tightens due to cable weight.
- F. In panelboards, cabinets, wireways, switches, enclosures, and equipment assemblies, neatly form, train, and tie the conductors with non- metallic ties.
- G. For connections to motors, transformers, and vibrating equipment, stranded conductors shall be used only from the last fixed point of connection to the motors, transformers, or vibrating equipment.
- H. Use expanding foam or non-hardening duct-seal to seal conduits entering a building, after installation of conductors.
- I. Conductor and Cable Pulling:
 1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling. Use lubricants approved for the cable.
 2. Use nonmetallic pull ropes.
 3. Attach pull ropes by means of either woven basket grips or pulling eyes attached directly to the conductors.
 4. All conductors in a single conduit shall be pulled simultaneously.
 5. Do not exceed manufacturer's recommended maximum pulling tensions

and sidewall pressure values.

- J. No more than three branch circuits shall be installed in any one conduit.
- K. When stripping stranded conductors, use a tool that does not damage the conductor or remove conductor strands.

3.2 INSTALLATION IN MANHOLES

- A. Train the cables around the manhole walls, but do not bend to a radius less than six times the overall cable diameter.

3.3 SPLICE AND TERMINATION INSTALLATION

- A. Splices and terminations shall be mechanically and electrically secure, and tightened to manufacturer's published torque values using a torque screwdriver or wrench.
- B. Where the Government determines that unsatisfactory splices or terminations have been installed, replace the splices or terminations at no additional cost to the Government.

3.4 CONDUCTOR IDENTIFICATION

- A. When using colored tape to identify phase, neutral, and ground conductors larger than No. 8 AWG, apply tape in half-overlapping turns for a minimum of 75mm (3 inches) from terminal points, and in junction boxes, pull boxes, and manholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable, stating size and insulation type.

3.5 FEEDER CONDUCTOR IDENTIFICATION

- A. In each interior pull box and each underground manhole and handhole, install brass tags on all feeder conductors to clearly designate their circuit identification and voltage. The tags shall be embossed type, 1-1/2 inches (40 mm) in diameter and 40 mils thick. Attach tags with plastic ties.

3.6 EXISITING CONDUCTORS

- A. Unless specifically indicated on the plans, existing conductors shall not be reused.

3.7 CONTROL WIRING INSTALLATION

- A. Unless otherwise specified on other sections, install control wiring, and connect to equipment to perform the required functions as specified or as shown on the drawings.
- B. Install a separate power supply circuit for each system, except where otherwise shown on the drawings.

3.8 CONTROL WIRING IDENTIFICATION

- A. Install a permanent wire marker on each wire at each termination.
- B. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.

- C. Wire markers shall retain their markings after cleaning.
- D. In each manhole and handhole, install embossed brass tags to identify the system served and function.

3.9 ACCEPTANCE CHECKS AND TESTS

- A. Perform in accordance with the manufacturer's recommendations, addition, include the following:
 - 1. Visual Inspection and Tests: Inspect physical condition.
 - 2. Electrical Tests:
 - a. After installation buy before connection to utilization devices, such as fixtures, motors, or appliances, test conductors' phase-to-phase and phase-to-ground resistance with an insulation resistance tester. Existing conductors to be reused shall also be tested.
 - b. Applied voltage shall be 500V DC for 300V rated cables, and 1000V DC for 600V rated cable. Apply test for one minute or until reading is constant for 15 seconds, whichever is longer. Minimum insulation resistance values shall not be less than 25 megaohms for 300 V rated cable and 100 megaohms for 600 V rated cable.
 - c. Perform Phase rotation test on all three-phase circuits.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, connection, and testing of grounding and bonding equipment, indicated as grounding equipment in this section.
- B. "Grounding electrode system" refers to grounding electrode conductors and all electrodes required or allowed by NEC, as well as made, supplementary, and lightning protection system grounding electrodes.
- C. The terms "connect" and "bond" are used interchangeably in this section and have the same meaning.

1.2 RELATED WORK

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.
- B. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low-voltage conductors.
- C. Section 26 05 33, RACEWAY BOXES FOR ELECTRICAL SYSTEMS: Conduit and boxes.
- D. Section 26 22 00, LOW-VOLTAGE TRANSFORMERS: Low-Voltage transformers.
- E. Section 26 24 13, DISTRIBUTION SWITCHBOARDS: Low-voltage distribution switchboards.
- F. Section 26 24 16, PANELBOARDS: Low-voltage panelboards.
- G. Section 26 36 23, AUTOMATIC TRANSFER SWITCHES: Automatic transfer switches.
- H. Section 26 41 00, FACILITY LIGHTNING PROTECTION: Lightning protection.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:

1. Shop Drawings:
 - a. Submit sufficient information to demonstrate compliance with drawings and specifications.
 - b. Submit plans showing the location of system grounding electrodes and connections, and the routing of aboveground and underground grounding electrode conductors.
2. Test Reports:
 - a. Two weeks prior to the final inspection, submit ground resistance field test reports to the COR.
3. Certifications:
 - a. Certification by the Contractor that the grounding equipment has been properly installed and tested.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. American Society for Testing and Materials (ASTM):
 1. B1-13 - Standard Specification for Hard-Drawn Copper Wire
 2. B3-13 - Standard Specification for Soft or Annealed Copper Wire
 3. B8-11 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- C. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 1. 81-12 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements
- D. National Fire Protection Association (NFPA):
 1. 70-17 - National Electrical Code (NEC)
 2. 70E-15 - National Electrical Safety Code
 3. 99-15 - Health Care Facilities
- E. Underwriters Laboratories, Inc. (UL):
 1. 44-14 - Thermoset-Insulated Wires and Cables
 2. 83-14 - Thermoplastic-Insulated Wires and Cables
 3. 467-13 - Grounding and Bonding Equipment

PART 2 – PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

- A. Equipment grounding conductors shall be insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be identified per NEC.
- B. Bonding conductors shall be bare stranded copper, except that sizes No. 10 AWG and smaller shall be bare solid copper. Bonding conductors shall be stranded for final connection to motors, transformers, and vibrating equipment.
- C. Conductor sizes shall not be less than shown on the drawings, or not less than required by the NEC, whichever is greater.
- D. Insulation: THHN-THWN and XHHW-2. XHHW-2 shall be used for isolated power systems.

2.2 GROUND RODS

- A. copper clad steel, 19 mm (0.75 inch) diameter by 3 M (10 feet) long.
- B. Quantity of rods shall be as shown on the drawings, and as required to obtain the specified ground resistance.

2.3 CONCRETE ENCASED ELECTRODE

- A. Concrete encased electrode shall be No. 4 AWG bare copper wire, installed per NEC.

2.4 GROUND CONNECTIONS

- A. Below Grade and Inaccessible Locations: Exothermic-welded type connectors.
- B. Above Grade:
 1. Bonding Jumpers: Listed for use with aluminum and copper conductors. For wire sizes No. 8 AWG and larger, use compression-type connectors. For wire sizes smaller than No. 8 AWG, use mechanical type lugs. Connectors or lugs shall use zinc-plated steel bolts, nuts, and washers. Bolts shall be torqued to the values recommended by the manufacturer.
 2. Connection to Building Steel: Exothermic-welded type connectors.
 3. Connection to Grounding Bus Bars: Listed for use with aluminum and copper conductors. Use mechanical type lugs, with zinc-plated steel bolts, nuts, and washers. Bolts shall be torqued to the values recommended by the manufacturer.
 4. Connection to Equipment Rack and Cabinet Ground Bars: Listed for use with aluminum and copper conductors. Use mechanical type lugs, with zinc-plated steel bolts, nuts, and washers. Bolts shall be torqued to the values recommended by the manufacturer.

2.5 EQUIPMENT RACK AND CABINET GROUND BARS

- A. Provide solid copper ground bars designed for mounting on the framework of open or cabinet-enclosed equipment racks. Ground bars shall have minimum dimensions of 6.3 mm (0.25 inch) thick x 19 mm (0.75 inch) wide, with length as required or as shown on the drawings. Provide

insulators and mounting brackets.

2.6 GROUND TERMINAL BLOCKS

- A. At any equipment mounting location (e.g., backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide mechanical type lugs, with zinc-plated steel bolts, nuts, and washers. Bolts shall be torqued to the values recommended by the manufacturer.

2.7 GROUNDING BUS BAR

- A. Pre-drilled rectangular copper bar with stand-off insulators, minimum 0.25 inch (6.3 mm) thick x 4 inches (100 mm) high in cross-section, length as shown on the drawings, with hole size, quantity, and spacing per detail shown on the drawings. Provide insulators and mounting brackets.

PART 3 – EXECUTION

3.1 GENERAL

- A. Installation shall be in accordance with the NEC, as shown on the drawings, and manufacturer's instructions.
- B. System Grounding:
 1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformer.
 2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
- C. Equipment Grounding: Metallic piping, building structural steel, electrical enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits, shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

- A. Make grounding connections, which are normally buried or otherwise inaccessible, by exothermic weld.

3.3 SECONDARY VOLTAGE EQUIPMENT AND CIRCUITS

- A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Structural Steel, and Supplemental Electrode(s):
 1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water pipe systems, building structural steel, and supplemental or made electrodes. Provide jumpers across insulating joints in the metallic piping.
 2. Provide a supplemental ground electrode as shown on the drawings and bond to the grounding electrode system.
- C. Switchgear, Switchboards, Unit Substations, Panelboards and other electrical equipment:

1. Connect the equipment grounding conductors to the ground bus.
2. Connect metallic conduits by grounding bushings and equipment grounding conductor to the equipment ground bus.

D. Transformers:

1. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from the transformer to the ground bar at the service equipment.

3.4 RACEWAY

A. Conduit Systems:

1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
2. Non-metallic conduit systems, except non-metallic feeder conduits that carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment, shall contain an equipment grounding conductor.
3. Metallic conduit that only contains a grounding conductor, and is provided for its mechanical protection, shall be bonded to that conductor at the entrance and exit from the conduit.
4. Metallic conduits which terminate without mechanical connection to an electrical equipment housing by means of locknut and bushings or adapters, shall be provided with grounding bushings. Connect bushings with a equipment grounding conductor to the equipment ground bus.

B. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, and power and lighting branch circuits.

C. Boxes, Cabinets, Enclosures, and Panelboards:

1. Bond the equipment grounding conductor to each pull box, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
2. Provide lugs in each box and enclosure for equipment grounding conductor termination.

D. Wireway Systems:

1. Bond the metallic structures of wireway to provide electrical continuity throughout the wireway system, by connecting a No. 6 AWG bonding jumper at all intermediate metallic enclosures and across all section junctions.
2. Install insulated No. 6 AWG bonding jumpers between the wireway system, bonded as required above, and the closest building ground at each end and approximately every 50 feet (16 meters).
3. Use insulated No. 6 AWG bonding jumpers to ground or bond metallic wireway at each end for all intermediate metallic enclosures and across all section junctions.
4. Use insulated No. 6 AWG bonding jumpers to ground cable tray to column-mounted building ground plates (pads) at each end and approximately every 15 M (49 feet).

E. Receptacles shall not be grounded through their mounting screws. Ground receptacles with a jumper from the receptacle green ground terminal to the device box ground screw and a jumper to the branch circuit equipment grounding conductor.

- F. Ground lighting fixtures to the equipment grounding conductor of the wiring system. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
- G. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.5 CORROSION INHIBITORS

- A. When making grounding and bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.

3.6 CONDUCTIVE PIPING

- A. Bond all conductive piping systems, interior and exterior, to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.
- B. In operating rooms and at intensive care and coronary care type beds, bond the medical gas piping and medical vacuum piping at the outlets directly to the patient ground bus.

3.7 LIGHTNING PROTECTION SYSTEM

- A. Bond the lightning protection system to the electrical grounding electrode system.

3.8 MAIN ELECTRICAL ROOM GROUNDING

- A. Provide ground bus bar and mounting hardware at each main electrical room where incoming feeders are terminated, as shown on the drawings. Connect to pigtail extensions of the building grounding ring, as shown on the drawings.

3.9 EXTERIOR LIGHT POLES

- A. Provide 6.1 M (20 feet) of No. 4 AWG bare copper coiled at bottom of pole base excavation prior to pour, plus additional un-spliced length in and above foundation as required to reach pole ground stud.

3.10 GROUND RESISTANCE

- A. Grounding system resistance to ground shall not exceed 5 ohms. Make any modifications or additions to the grounding electrode system necessary for compliance without additional cost to the Government. Final tests shall ensure that this requirement is met.
- B. Grounding system resistance shall comply with the electric utility company ground resistance requirements.

3.11 GROUND ROD INSTALLATION

- A. For outdoor installations, drive each rod vertically in the earth, until top of rod is 24 Inches (610 mm) below final grade.

- B. For indoor installations, leave 100 mm (4 inches) of each rod exposed.
- C. Where buried or permanently concealed ground connections are required, make the connections by the exothermic process, to form solid metal joints. Make accessible ground connections with mechanical pressure-type ground connectors.
- D. Where rock or impenetrable soil prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified ground resistance.

3.12 ACCEPTANCE CHECKS AND TESTS

- A. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized or connected to the electric utility company ground system and shall be made in normally dry conditions not fewer than 48 hours after the last rainfall.
- B. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.
- C. Below-grade connections shall be visually inspected by the COR prior to backfilling. The Contractor shall notify the COR 24 hours before the connections are ready for inspection.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

1.2 SUBMITTALS

- A. Product data for each type of product specified.
- B. Hanger and support schedule showing manufacturer's figure number, size, spacing, features, and application for each required type of hanger, support, sleeve, seal, and fastener to be used.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Slotted Metal Angle and U-Channel Systems:
 - a. Allied Tube & Conduit
 - b. B-Line Systems, Inc.
 - c. GS Metals Corp.
 - d. Unistrut Diversified Products
 2. Conduit Sealing Bushings:
 - a. O-Z/Gedney
 - b. Cooper Industries, Inc.
 - c. GS Metals Corp.
 - d. Killark Electric Mfg. Co.
 - e. Madison Equipment Co.
 - f. Raco, Inc.
 - g. Spring City Electrical Mfg. Co.
 - h. Thomas & Betts Corp.

2.2 COATINGS

- A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot dip galvanized.

2.3 MANUFACTURED SUPPORTING DEVICES

- A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps

- B. Fasteners: Types, materials, and construction features as follows:
1. Expansion Anchors: Carbon steel wedge or sleeve type.
 2. Toggle Bolts: All steel springhead type.
 3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.
- C. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.
- D. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.
- E. U-Channel Systems: 12-gage steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.
- F. Supports: Provide supporting devices of types, sizes and materials indicated; and having the following construction features:
1. One-Hole Conduit Straps: For supporting 1" and smaller rigid metal conduit; galvanized steel.
 2. Two-Hole Conduit Straps: For supporting rigid metal conduit larger than 1"; galvanized steel; 3/4" strap width; and 2-1/8" between center of screw holes.

2.4 FABRICATED SUPPORTING DEVICES

- A. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.
- B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

2.5 FIRE SEALS

- A. Material: Firestopping material shall be asbestos free, 100% intumescent, have code approval under BOCA, ICBO, SSBC, NFPA 101, NFPA 70, and be capable of maintaining an effective barrier against flame and gases in compliance with the following requirements.
- B. Flame Spread: 25 or less, ASTM E84
- C. Fire Resistance and Hose Stream Tests: Firestopping materials shall be rated "F" and "T" in accordance with ASTM E 814 or UL 1479. Rating periods shall conform to the following:
1. (F) 3 (T) 3 Time-rated floor or wall assemblies.
 2. (F) 3 (T) 3 Openings between floor slabs and curtain wall.

D. Manufacturers: Subject to compliance with requirements, provide fire seals of the following:

1. 3M Company
2. Tremco
3. Approved equal

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.
- B. Coordinate with the building structural system and with other electrical installation.
- C. Raceway Supports: Comply with the NEC and the following requirements:
 1. Conform to manufacturer's recommendations for selection and installation of supports.
 2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs. provide additional strength until there is a minimum of 200 lbs., safety allowance in the strength of each support.
 3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
 4. Support parallel runs of horizontal raceways together on trapeze-type hangers. Use 3/8" diameter or larger threaded steel rods for support.
 5. Support individual horizontal raceways by separate pipe hangers. Use #9 wire support for conduits 1- inch and smaller serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use 1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing. For hanger rods supporting 1-1/2" or larger conduits provide 3/8" minimum threaded steel rods with pipe hangers.
 6. Space supports for raceways in accordance with NEC.
 7. In all runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.
 8. Threaded rod supports to have bottoms cut off at a maximum length equal to rod diameter below bottom nut.
- D. Miscellaneous Supports: Support miscellaneous electrical components separately and as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.
- E. In open overhead spaces, support metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.
- E. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts, or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws, where authorized by the Owner and structural engineer. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
 - a. Anchoring methods as follows:
 - 1) Hollow Masonry: Toggle Bolts.
 - 2) Solid Masonry: Lead expansion anchors or preset inserts.
 - 3) Metal Surfaces: Machine screws, bolts, or welded studs.
 - 4) Wood Surfaces: Wood screws.
 - 5) Concrete Surfaces: Lead expansion or self-drilling anchors.
 - 6) Metal Studs: Sheet metal screws.
 - b. Raceways shall be supported every 10 feet and within 36 inches of each outlet, ell, fitting, panel, etc.
 - c. Conduit shall not be supported or attached from ceiling support wires.
 - d. Raceways or equipment shall not be suspended from piping or ductwork.
 - e. Drilling of structural steel members is prohibited.
2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.
3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.

3.2 PERSONNEL PROTECTION

- A. Where U-channel systems, angles, brackets, or other standard structural metal shapes are readily accessible and exposed to personnel, provide plastic or rubber end caps.
- B. Where threaded rod supports are readily accessible and exposed to personnel, provide plastic or rubber end caps.

3.3 FIRESTOPPING LOCATIONS

- A. Preparation:
 1. Coordination: Coordinate the work with other trades. Firestopping materials at penetrations of insulated pipes and ducts can be applied after insulation is in place. If insulation is composed of combustible material, the thickness of firestopping materials must be equivalent to that of the insulation. If the insulation is composed of non-combustible material, it may be considered as part of the penetrating item.
 2. Surface Preparation: Surface Preparation to be in contact with firestopping materials shall be free of dirt, grease, oil, loose material or other substances that may affect proper fitting or the required fire resistance.
- B. Installation: Install firestopping materials in accordance with the manufacturer's instructions and the requirements of Division 7 Section "Firestopping".

- C. Cleaning: After completion of firestopping work in any area, equipment shall be reviewed and walls, ceilings and all other surfaces not to receive firestopping shall be cleaned of deposits of firestop materials.
- D. Inspection: The architect may select and the Owner will pay an independent testing laboratory to examine fire stopped areas to ensure proper installation prior to concealing or enclosing the fire stopped area.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, and connection of conduit, fittings, and boxes, to form complete, coordinated, grounded raceway systems. Raceways are required for all wiring unless shown or specified otherwise.
- B. Definitions: The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK

- A. Section 06 10 00, ROUGH CARPENTRY: Mounting board for telephone closets.
- B. Section 07 60 00, FLASHING AND SHEET METAL: Fabrications for the deflection of water away from the building envelope at penetrations.
- C. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire rated construction.
- D. Section 07 92 00, JOINT SEALANTS: Sealing around conduit penetrations through the building envelope to prevent moisture migration into the building.
- E. Section 09 91 00, PAINTING: Identification and painting of conduit and other devices.
- F. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Conduits bracing.
- G. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.
- H. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- I. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Underground conduits.
- J. Section 31 20 00, EARTHWORK: Bedding of conduits.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:
1. Shop Drawings:
 - a. Size and location of main feeders.
 - b. Size and location of panels and pull-boxes.
 - c. Layout of required conduit penetrations through structural elements.
 - d. Submit the following data for approval:
 - 1.) Raceway types and sizes.
 - 2.) Conduit bodies, connectors and fittings.
 - 3.) Junction and pull boxes, types and sizes.
 2. Certifications: Two weeks prior to final inspection, submit the following:
 - a. Certification by the manufacturer that raceways, conduits, conduit bodies, connectors, fittings, junction and pull boxes, and all related equipment conform to the requirements of the drawings and specifications.
 - b. Certification by the Contractor that raceways, conduits, conduit bodies, connectors, fittings, junction and pull boxes, and all related equipment have been properly installed.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. American Iron and Steel Institute (AISI):
1. S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members
- C. National Electrical Manufacturers Association (NEMA):
1. C80.1-15 - Electrical Rigid Steel Conduit
 2. C80.3-15 - Steel Electrical Metal Tubing
 3. C80.6-05 - Electrical Intermediate Metal Conduit
 4. FB1-14 - Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable
 5. FB2.10-13 - Selection and Installation Guidelines for Fittings for use with non-Flexible Conduit or Tubing (Rigid Metal Conduit, Intermediate Metallic Conduit, and Electrical Metallic Tubing)
 6. FB2.20-14 - Selection and Installation Guidelines for Fittings for use with Flexible Electrical Conduit and Cable
 7. TC-2-13 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit
 8. TC-3-13 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- D. National Fire Protection Association (NFPA):

1. 70-17. - National Electrical Code (NEC)
- E. Underwriters Laboratories, Inc. (UL):
1. 1-05 - Flexible Metal Conduit
 2. 5-16 - Surface Metal Raceway and Fittings
 3. 6-07 - Electrical Rigid Metal Conduit – Steel
 4. 50-15 - Enclosures for Electrical Equipment
 5. 360-13 - Liquid-Tight Flexible Steel Conduit
 6. 467-13 - Grounding and Bonding Equipment
 7. 514A-13 - Metallic Outlet Boxes
 8. 514B-12 - Conduit, Tubing, and Cable Fittings
 9. 514C-14 - Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
 10. 651-11 - Schedule 80 Rigid PVC Conduit and Fittings
 11. 651A-11 - Type EB and A Rigid PVC Conduit and HDPE Conduit
 12. 797-07 - Electrical Metallic Tubing
 13. 1242-14 – Electrical Intermediate Metal Conduit – Steel

PART 2 – PRODUCTS

2.1 MATERIAL

- A. Conduit Size: In accordance with the NEC, but not less than 13 mm (0.5-inch) unless otherwise shown. Where permitted by the NEC, 13 mm (0.5-inch) flexible conduit may be used for tap connections to recessed lighting fixtures.
- B. Conduit:
1. Size: In accordance with the NEC, but not less than 13 mm (0.5- inch).
 2. Rigid Steel Conduit (RMC): Shall conform to UL 6 and NEMA C80.1.
 3. Rigid Intermediate Steel Conduit (IMC): Shall conform to UL 1242 and NEMA C80.6.
 4. Electrical Metallic Tubing (EMT): Shall conform to UL 797 and NEMA C80.3. Maximum size not to exceed 105 mm (4 inches) and shall be permitted only with cable rated 600 V or less.
 5. Flexible Metal Conduit: Shall conform to UL 1.
 6. Liquid-tight Flexible Metal Conduit: Shall conform to UL 360.
 7. Direct Burial Plastic Conduit: Shall conform to UL 651 and UL 651A, PVC-80.
 8. Surface Metal Raceway: Shall conform to UL 5.
- C. Conduit Fittings:
1. Rigid Steel and Intermediate Metallic Conduit Fittings:
 - a. Fittings shall meet the requirements of UL 514B and NEMA FB1.
 - b. Standard threaded couplings, locknuts, bushings, conduit bodies, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are also acceptable.
 - c. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
 - d. Bushings: Metallic insulating type, consisting of an insulating insert, molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.

- e. Erickson (Union-Type) and Set Screw Type Couplings: Approved for use in concrete are permitted for use to complete a conduit run where conduit is installed in concrete. Use set screws of case-hardened steel with hex head and cup point to firmly seat in conduit wall for positive ground. Tightening of set screws with pliers is prohibited.
 - f. Sealing Fittings: Threaded cast iron type. Use continuous drain-type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank cover plates having the same finishes as that of other electrical plates in the room.
2. Electrical Metallic Tubing Fittings:
- a. Fittings and conduit bodies shall meet the requirements of UL 514B, NEMA C80.3, and NEMA FB1.
 - b. Only steel or malleable iron materials are acceptable.
 - c. Compression Couplings and Connectors: Concrete-tight and rain-tight, with connectors having insulated throats.
 - d. Indent-type connectors or couplings are prohibited.
 - e. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
3. Flexible Metal Conduit Fittings:
- a. Conform to UL 514B. Only steel or malleable iron materials are acceptable.
 - b. Clamp-type, with insulated throat.
4. Liquid-tight Flexible Metal Conduit Fittings:
- a. Fittings shall meet the requirements of UL 514B and NEMA FB1.
 - b. Only steel or malleable iron materials are acceptable.
 - c. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
5. Direct Burial Plastic Conduit Fittings: Fittings shall meet the requirements of UL 514C and NEMA TC3.
6. Surface Metal Raceway Fittings: As recommended by the raceway manufacturer. Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, conduit entry fittings, accessories, and other fittings as required for complete system.
7. Expansion and Deflection Couplings:
- a. Conform to UL 467 and UL 514B.
 - b. Accommodate a 19 mm (0.75-inch) deflection, expansion, or contraction in any direction, and allow 30-degree angular deflections.
 - c. Include internal flexible metal braid, sized to guarantee conduit ground continuity and a low-impedance path for fault currents, in accordance with UL 467 and the NEC tables for equipment grounding conductors.
 - d. Jacket: Flexible, corrosion-resistant, watertight, moisture and heat-resistant molded rubber material with stainless steel jacket clamps.
- D. Conduit Supports:
1. Parts and Hardware: Zinc-coat or provide equivalent corrosion protection.

2. Individual Conduit Hangers: Designed for the purpose, having a pre-assembled closure bolt and nut, and provisions for receiving a hanger rod.
 3. Multiple Conduit (Trapeze) Hangers: Not less than 38 mm x 38 mm (1.5 x 1.5 inches), 12-gauge steel, cold-formed, lipped channels; with not less than 9 mm (0.375-inch) diameter steel hanger rods.
 4. Solid Masonry and Concrete Anchors: Self-drilling expansion shields, or machine bolt expansion.
- E. Outlet, Junction, and Pull Boxes:
1. Comply with UL-50 and UL-514A.
 2. Rustproof cast metal where required by the NEC or shown on drawings.
 3. Sheet Metal Boxes: Galvanized steel, except where shown on drawings.
- F. Metal Wireways: Equip with hinged covers, except as shown on drawings. Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for a complete system.

PART 3 – EXECUTION

3.1 PENETRATIONS

- A. Cutting or Holes:
1. Cut holes in advance where they should be placed in the structural elements, such as ribs or beams. Obtain the approval of the COR prior to drilling through structural elements.
 2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammers, impact electric, hand, or manual hammer-type drills are not allowed, except when permitted by the COR where working space is limited.
- B. Firestop: Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING.
- C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal the gap around conduit to render it watertight, as specified in Section 07 92 00, JOINT SEALANTS.

3.2 INSTALLATION, GENERAL

- A. In accordance with NEC, NEMA, UL, as shown on drawings, and as specified herein.
- B. Raceway systems used for Essential Electrical Systems (EES) shall be entirely independent of other raceway systems.
- C. Install conduit as follows:
1. In complete mechanically and electrically continuous runs before pulling in cables or wires.
 2. Unless otherwise indicated on the drawings or specified herein, installation of all conduits shall be concealed within finished walls, floors, and ceilings.
 3. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new conduits.

4. Assure conduit installation does not encroach into the ceiling height head room, walkways, or doorways.
5. Cut conduits square, ream, remove burrs, and draw up tight.
6. Independently support conduit at 2.4 M (8 feet) on centers with specified materials and as shown on drawings.
7. Do not use suspended ceilings, suspended ceiling supporting members, lighting fixtures, other conduits, cable tray, boxes, piping, or ducts to support conduits and conduit runs.
8. Support within 300 mm (12 inches) of changes of direction, and within 300 mm (12 inches) of each enclosure to which connected.
9. Close ends of empty conduits with plugs or caps at the rough-in stage until wires are pulled in, to prevent entry of debris.
10. Conduit installations under fume and vent hoods are prohibited.
11. Secure conduits to cabinets, junction boxes, pull-boxes, and outlet boxes with bonding type locknuts. For rigid steel and IMC conduit installations, provide a locknut on the inside of the enclosure, made up wrench tight. Do not make conduit connections to junction box covers.
12. Flashing of penetrations of the roof membrane is specified in Section 07 60 00, FLASHING AND SHEET METAL.
13. Conduit bodies shall only be used for changes in direction and shall not contain splices.

D. Conduit Bends:

1. Make bends with standard conduit bending machines.
2. Conduit hickey may be used for slight offsets and for straightening stubbed out conduits.
3. Bending of conduits with a pipe tee or vise is prohibited.

E. Layout and Homeruns:

1. Install conduit with wiring, including homeruns, as shown on drawings.
2. Deviations: Make only where necessary to avoid interferences and only after drawings showing the proposed deviations have been submitted and approved by the COR.

3.3 CONCEALED WORK INSTALLATION

A. In Concrete:

1. Conduit: Rigid steel, IMC, or EMT. Do not install EMT in concrete slabs that are in contact with soil, gravel, or vapor barriers.
2. Align and run conduit in direct lines.
3. Install conduit through concrete beams only:
 - a. Where shown on the structural drawings.
 - b. As approved by the COR prior to construction, and after submittal of drawing showing location, size, and position of each penetration.
4. Installation of conduit in concrete that is less than 75 mm (3 inches) thick is prohibited.
 - a. Conduit outside diameter larger than one-third of the slab thickness is prohibited.
 - b. Space between conduits in slabs: Approximately six conduit diameters apart, and one conduit diameter at conduit crossings.
 - c. Install conduits approximately in the center of the slab so that there will be a minimum of 19 mm (0.75-inch) of concrete around the conduits.

5. Make couplings and connections watertight. Use thread compounds that are UL approved conductive type to ensure low resistance ground continuity through the conduits. Tightening setscrews with pliers is prohibited.
- B. Above Furred or Suspended Ceilings and in Walls:
1. Conduit for Conductors Above 600 V: Rigid steel. Mixing different types of conduits in the same system is prohibited.
 2. Conduit for Conductors 600 V and Below: Rigid steel, IMC or EMT. Mixing different types of conduits in the same system is prohibited.
 3. Align and run conduit parallel or perpendicular to the building lines.
 4. Connect recessed lighting fixtures to conduit runs with maximum 1.8 M (6 feet) of flexible metal conduit extending from a junction box to the fixture.
 5. Tightening set screws with pliers is prohibited.
 6. For conduits running through metal studs, limit field cut holes to no more than 70% of web depth. Spacing between holes shall be at least 457 mm (18 inches). Cuts or notches in flanges or return lips shall not be permitted.

3.4 EXPOSED WORK INSTALLATION

- A. Unless otherwise indicated on drawings, exposed conduit is only permitted in mechanical and electrical rooms.
- B. Conduit for Conductors Above 600 V: Rigid steel. Mixing different types of conduits in the system is prohibited.
- C. Conduit for Conductors 600 V and Below: Rigid steel, IMC, or EMT. Mixing different types of conduits in the system is prohibited.
- D. Align and run conduit parallel or perpendicular to the building lines.
- E. Install horizontal runs close to the ceiling or beams and secure with conduit straps.
- F. Support horizontal or vertical runs at not over 2.4 M (8 feet) intervals.
- G. Surface Metal Raceways: Use only where shown on drawings.
- H. Painting:
 1. Paint exposed conduit as specified in Section 09 91 00, PAINTING.
 2. Paint all conduits containing cables rated over 600 V safety orange. Refer to Section 09 91 00, PAINTING for preparation, paint type, and exact color. In addition, paint legends, using 50 mm (2 inch) high black numerals and letters, showing the cable voltage rating. Provide legends where conduits pass through walls and floors and at maximum 6 M (20 feet) intervals in between.

3.5 DIRECT BURIAL INSTALLATION

- A. Refer to Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION.

3.6 HAZARDOUS LOCATIONS

- A. Use rigid steel conduit only.
- B. Install UL approved sealing fittings that prevent passage of explosive vapors in hazardous areas equipped with explosion-proof lighting fixtures, switches, and receptacles, as required by the NEC.

3.7 WET OR DAMP LOCATIONS

- A. Use rigid steel or IMC conduits unless as shown on drawings.
- B. Provide sealing fittings to prevent passage of water vapor where conduits pass from warm to cold locations, i.e., refrigerated spaces, constant-temperature rooms, air-conditioned spaces, building exterior walls, roofs, or similar spaces.
- C. Use rigid steel or IMC conduit within 1.5 M (5 feet) of the exterior and below concrete building slabs in contact with soil, gravel, or vapor barriers; unless as shown on drawings. Conduit shall be half-lapped with 10 mil PVC tape before installation. After installation, completely recoat or retape any damaged areas of coating.
- D. Conduits run on roof shall be supported with integral galvanized lipped steel channel, attached to UV-inhibited polycarbonate or polypropylene blocks every 2.4 M (8 feet) with 9 mm (3/8-inch) galvanized threaded rods, square washer and locknut. Conduits shall be attached to steel channel with conduit clamps.

3.8 MOTORS AND VIBRATING EQUIPMENT

- A. Use flexible metal conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission.
- B. Use liquid-tight flexible metal conduit for installation in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, inside airstream of HVAC units, and locations subject to seepage or dripping of oil, grease, or water.
- C. Provide a green equipment grounding conductor with flexible and liquid-tight flexible metal conduit.

3.9 EXPANSION JOINTS

- A. Conduits 75 mm (3 inch) and larger that are secured to the building structure on opposite sides of a building expansion joint require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.
- B. Provide conduits smaller than 75 mm (3 inch) with junction boxes on both sides of the expansion joint. Connect flexible metal conduits to junction boxes with sufficient slack to produce a 125 mm (5 inch) vertical drop midway between the ends of the flexible metal conduit. Flexible metal conduit shall have a green insulated copper bonding jumper installed. In lieu of this flexible metal conduit, expansion and deflection couplings as specified above are acceptable.
- C. Install expansion and deflection couplings where shown.
- D. Seismic Areas: In seismic areas, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint. Connect conduits to junction boxes with 375 mm (15 inches) of slack flexible conduit. Flexible conduit shall have a copper bonding jumper installed.

3.10 CONDUIT SUPPORTS

- A. Safe working load shall not exceed one-quarter of proof test load of fastening devices.
- B. Use pipe straps or individual conduit hangers for supporting individual conduits.

- C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and an additional 90 kg (200 lbs). Attach each conduit with U-bolts or other approved fasteners.
- D. Support conduit independently of junction boxes, pull-boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.
- E. Fasteners and Supports in Solid Masonry and Concrete:
 - 1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
 - 2. Existing Construction:
 - a. Steel expansion anchors not less than 6 mm (0.25-inch) bolt size and not less than 28 mm (1.125 inch) in embedment.
 - b. Power set fasteners not less than 6 mm (0.25-inch) diameter with depth of penetration not less than 75 mm (3 inch).
 - c. Use vibration and shock-resistant anchors and fasteners for attaching to concrete ceilings.
- F. Hollow Masonry: Toggle bolts.
- G. Bolts supported only by plaster or gypsum wallboard are not acceptable.
- H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.
- I. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.
- J. Chain, wire, or perforated strap shall not be used to support or fasten conduit.
- K. Spring steel type supports or fasteners are prohibited for all uses except horizontal and vertical supports/fasteners within walls.
- L. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

3.11 BOX INSTALLATION

- A. Boxes for Concealed Conduits:
 - 1. Flush-mounted.
 - 2. Provide raised covers for boxes to suit the wall or ceiling, construction, and finish.
- B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling-in operations or where more than the equivalent of 4-90 degree bends are necessary.
- C. Locate pull boxes so that covers are accessible and easily removed. Coordinate locations with piping and ductwork where installed above ceilings.

- D. Remove only knockouts as required. Plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.
- E. Outlet boxes mounted back-to-back in the same wall are prohibited. A minimum 600 mm (24 inch) center-to-center lateral spacing shall be maintained between boxes.
- F. Flush-mounted wall or ceiling boxes shall be installed with raised covers so that the front face of raised cover is flush with the wall. Surface-mounted wall or ceiling boxes shall be installed with surface- style flat or raised covers.
- G. Minimum size of outlet boxes for ground fault circuit interrupter (GFCI) receptacles is 100 mm (4 inches) square x 55 mm (2.125 inches) deep, with device covers for the wall material and thickness involved.
- H. Stencil or install phenolic nameplates on covers of the boxes identified on riser diagrams; for example, "SIG-FA JB No. 1."
- I. On all branch circuit junction box covers, identify the circuits with black marker.

END OF SECTION

SECTION 26 24 13

DISTRIBUTION SWITCHBOARDS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, connection, and testing of the low-voltage circuit-breaker distribution switchboards, indicated as switchboard(s) in this section.

1.2 RELATED WORK

- A. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Requirements for seismic restraint for nonstructural components.
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.
- C. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low-voltage conductors.
- D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible fault currents.
- E. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduit.
- F. Section 26 05 73, OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY: Short circuit and coordination study, and requirements for a coordinated electrical system.
- G. Section 26 43 13, SURGE PROTECTIVE DEVICES: Surge protective devices for switchboards.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 FACTORY TESTS

- A. Factory Tests shall be required.
- B. Factory Tests shall be in accordance with Paragraph, MANUFACTURED PRODUCTS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirement:
 1. Tests shall be conducted per NEMA PB 2.
 2. Verify that circuit breaker sizes and types correspond to drawings, and the Overcurrent Protective Device Coordination Study.
 3. Verify tightness of bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.
 4. Exercise all active components.
 5. Perform an insulation-resistance test, phase to ground, on each bus section, with phases not under test grounded, in accordance with manufacturer's published data.

6. Perform insulation-resistance tests on control wiring with respect to ground. Applied potential shall be 500 V DC for 300-volt rated cable and 1000 V DC for 600-volt rated cable, or as required if solid-state components or control devices cannot tolerate the applied voltage.
7. If applicable, verify correct function of control transfer relays located in the switchboard with multiple control power sources.
8. Perform phasing checks on double-ended or dual-source switchboards to insure correct bus phasing from each source.

1.5 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:
 1. Shop Drawings:
 - a. Switchboard shop drawings shall be submitted simultaneously with or after the Overcurrent Protective Device Coordination Study.
 - b. Submit sufficient information to demonstrate compliance with drawings and specifications.
 - c. Prior to fabrication of switchboards, submit the following data for approval:
 - 1.) Complete electrical ratings.
 - 2.) Circuit breaker sizes.
 - 3.) Interrupting ratings.
 - 4.) Safety features.
 - 5.) Accessories and nameplate data.
 - 6.) Switchboard one line diagram, showing ampere rating, number of bars per phase and neutral in each bus run (horizontal and vertical), bus spacing, equipment ground bus, and bus material.
 - 7.) Elementary and interconnection wiring diagrams.
 - 8.) Technical data for each component.
 - 9.) Dimensioned exterior views of the switchboard.
 - 10.) Dimensioned section views of the switchboard.
 - 11.) Floor plan of the switchboard.
 - 12.) Foundation plan for the switchboard.
 - 13.) Provisions and required locations for external conduit and wiring entrances.
 - 14.) Approximate design weights.
 - d. Certification from the manufacturer that representative switchboards have been seismically tested to International Building Code requirements. Certification shall be based upon simulated seismic forces on a shake table or by analytical methods, but not by experience data or other methods.
 2. Manuals:
 - a. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.
 - 1.) Schematic signal and control diagrams, with all terminals identified, matching terminal identification in the switchboard.
 - 2.) Include information for testing, repair, trouble shooting, assembly, disassembly, and factory recommended/required periodic maintenance procedures and frequency.

- 3.) Provide a replacement and spare parts list. Include a list of tools and instruments for testing and maintenance purposes.
- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
3. Certifications: Two weeks prior to final inspection, submit the following.
 - a. Certification by the manufacturer that the switchboards conform to the requirements of the drawings and specifications.
 - b. Certification by the Contractor that the switchboards have been properly installed, adjusted, and tested.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. Institute of Engineering and Electronic Engineers (IEEE):
 1. C37.13-15 - Low Voltage AC Power Circuit Breakers Used in Enclosures
 2. C57.13-16 - Instrument Transformers
 3. C62.41.1-02 - Surge Environment in Low-voltage (1000V and less) AC Power Circuits
 4. C62.45-02 - Surge Testing for Equipment connected to Low-Voltage AC Power Circuits
- C. International Code Council (ICC):
 1. IBC-15 - International Building Code
- D. National Electrical Manufacturer's Association (NEMA):
 1. PB 2-11 - Dead front Distribution Switchboards
 2. PB 2.1-13 - Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less
- E. National Fire Protection Association (NFPA):
 1. 70-17 - National Electrical Code (NEC)
- F. Underwriters Laboratories, Inc. (UL):
 1. 67-09 - Panelboards
 2. 489-16 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
 3. 891-05 - Switchboards

PART 2 – PRODUCTS

2.1 GENERAL

- A. Shall be in accordance with IEEE, NEMA, NFPA, UL, as shown on the drawings, and have the

following features:

1. Switchboard shall be a complete, grounded, continuous-duty, integral assembly, dead-front, dead-rear, self-supporting, indoor type switchboard assembly. Incorporate devices shown on the drawings and all related components required to fulfill operational and functional requirements.
2. Ratings shall not be less than shown on the drawings. Short circuit ratings shall not be less than the available fault current shown in the Overcurrent Protective Device Coordination Study.
3. Switchboard shall conform to the arrangements and details shown on the drawings.
4. Coordinate all requirements with the electric utility company supplying electrical service to the switchboard. The incoming electric utility feeder and revenue metering installation shall conform to the requirements of the electric utility company.
5. Switchboards shall be assembled, connected, and wired at the factory so that only external circuit connections are required at the construction site. Split the structure only as required for shipping and installation. Packaging shall provide adequate protection against rough handling during shipment.
6. All non-current-carrying parts shall be grounded per Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS for additional requirements.
7. Series rated switchboards are not allowed.

2.2 BASIC ARRANGEMENT

A. Type 1: Switchboard shall be front accessible with the following features:

1. Device mounting:
 - a. Main breaker: Individually mounted and compartmented or group mounted with feeder breakers.
 - b. Feeder breakers: Group mounted.
2. Section alignment: As shown on the drawings.
3. Accessibility:
 - a. Main section line and load terminals: Front and side.
 - b. Distribution section line and load terminals: Front.
 - c. Through bus connections: Front and end.
4. Bolted line and load connections.
5. Full height wiring gutter covers for access to wiring terminals.

2.3 HOUSING

A. Shall have the following features:

1. Frames and enclosures:
 - a. The assembly shall be braced with reinforcing gussets using bolted connections to assure rectangular rigidity.
 - b. The enclosure shall be steel, leveled, and not less than the gauge required by applicable publications.
 - c. Die-pierce the holes for connecting adjacent structures to ensure proper alignment, and to allow for future additions.
 - d. All bolts, nuts, and washers shall be zinc-plated steel.

B. Finish:

1. All metal surfaces shall be thoroughly cleaned, phosphatized and factory primed prior to applying baked enamel or lacquer finish.
2. Provide a light gray finish for indoor switchboard.

2.4 BUSES

A. Bus Bars and Interconnections:

1. Provide copper phase and neutral buses, fully rated for the amperage as shown on the drawings for the entire length of the switchboard. Bus laminations shall have a minimum of 6 mm (1/4 inch) spacing.
2. Mount the buses on appropriately spaced insulators and brace to withstand the available short circuit currents.
3. The bus and bus compartment shall be designed so that the acceptable NEMA standard temperature rises are not exceeded.
4. Install a copper ground bus the full length of the switchboard assembly.
5. Main Bonding Jumper: An un-insulated copper bus, size as shown on drawings, shall interconnect the neutral and ground buses, when the switchboard is used to establish the system common ground point.
6. All bolts, nuts, and washers shall be zinc-plated steel. Bolts shall be torqued to the values recommended by the manufacturer.
7. Make provisions for future bus extensions by means of bolt holes or other approved method.

2.5 MAIN CIRCUIT BREAKERS

A. Type I or Type II Switchboards: Provide molded case main circuit breakers as shown on the drawings. Circuit breakers shall be the solid-state adjustable trip type.

1. Trip units shall have field adjustable tripping characteristics as follows:
 - a. Long time pickup.
 - b. Long time delay.
 - c. Short time pickup.
 - d. Short time delay.
 - e. Instantaneous.
 - f. Ground fault pickup.
 - g. Ground fault delay.
2. Breakers with same frame size shall be interchangeable with each other.

2.6 FEEDER CIRCUIT BREAKERS

A. Provide molded case circuit breakers as shown on the drawings.

B. Non-adjustable Trip Molded Case Circuit Breakers:

1. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time characteristics, and instantaneous magnetic trip.
2. Breaker features shall be as follows:
 - a. A rugged, integral housing of molded insulating material.
 - b. Silver alloy contacts.
 - c. Arc quenchers and phase barriers for each pole.
 - d. Quick-make, quick-break, operating mechanisms.

- e. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
 - f. Electrically and mechanically trip free.
 - g. An operating handle which indicates ON, TRIPPED, and OFF positions.
 - h. Line and load connections shall be bolted.
 - i. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.
- C. Adjustable Trip Molded Case Circuit Breakers:
- 1. Provide molded case, solid state adjustable trip type circuit breakers.
 - 2. Trip units shall have field adjustable tripping characteristics as follows:
 - a. Long time pickup.
 - b. Long time delay.
 - c. Short time pickup.
 - d. Short time delay.
 - e. Instantaneous.
 - f. Ground fault pickup.
 - g. Ground fault delay.
 - 3. Breakers with same frame size shall be interchangeable with each other.

2.7 ELECTRIC UTILITY COMPANY EQUIPMENT

- A. Provide separate compartment for electric utility company metering equipment as shown on drawings.
- B. Provide suitable arrangements within the electric utility company metering compartment for mounting metering equipment. Obtain the electric utility company's approval of the compartment arrangements prior to fabrication of the switchboard.
- C. Allow access to electric utility company personnel as required for installation of utility metering equipment.

2.8 SURGE PROTECTIVE DEVICES

- A. Refer to Section 26 43 13, SURGE PROTECTIVE DEVICES.

2.9 METERING

- A. Refer to Section 25 10 10, ADVANCED UTILITY METERING. Refer to drawings for meter locations.
- B. Provide current transformers for each meter. Current transformers shall be wired to shorting-type terminal blocks.
- C. Provide voltage transformers including primary fuses and secondary protective devices for metering as shown on the drawings.

2.10 OTHER EQUIPMENT

- A. Furnish tools and accessories required for circuit breaker and switchboard test, inspection, maintenance, and proper operation.

- B. Panelboards: Requirement for panelboards shown to be installed in the switchboard shall be as shown on the drawings and in Section 26 24 16, PANELBOARDS.

2.11 CONTROL WIRING

- A. Switchboard control wires shall not be less than No. 14 AWG copper 600 volt rated. Install wiring complete at the factory, adequately bundled and protected. Provide separate control circuit fuses in each breaker compartment and locate for ease of access and maintenance.

2.12 NAMEPLATES AND MIMIC BUS

- A. Nameplates: For Normal Power system, provide laminated black phenolic resin with white core with 12 mm (1/2 inch) engraved lettered nameplates next to each circuit breaker. For Essential Electrical System, provide laminated red phenolic resin with white core with 12mm (1/2 inch) engraved lettered nameplates next to each circuit breaker. Nameplates shall indicate equipment served, spaces, or spares in accordance with one line diagram shown on drawings. Nameplates shall be mounted with plated screws on front of breakers or on equipment enclosure next to breakers. Mounting nameplates only with adhesive is not acceptable.
- B. Mimic Bus: Provide an approved mimic bus on front of each switchboard assembly. Color shall be black for the Normal Power system and red for the Essential Electrical System, either factory-painted plastic or metal strips. Plastic tape shall not be used. Use symbols similar to one line diagram shown on drawings. Plastic or metal strips shall be mounted with plated screws.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install switchboards in accordance with the NEC, as shown on the drawings, and as recommended by the manufacturer.
- B. Anchor switchboards with rustproof bolts, nuts, and washers not less than 13 mm (1/2 inch) diameter, in accordance with manufacturer's instructions, and as shown on drawings.
- C. In seismic areas, switchboards shall be adequately anchored and braced per details on structural contract drawings to withstand the seismic forces at the location where installed.

3.2 ACCEPTANCE CHECKS AND TESTS

- A. Perform in accordance with the manufacturer's recommendations. In addition, include the following:

1. Visual Inspection and Tests:

- a. Compare equipment nameplate data with specifications and approved shop drawings.
- b. Inspect physical, electrical, and mechanical condition.
- c. Verify appropriate anchorage, required area clearances, and correct alignment.
- d. Verify that circuit breaker sizes and types correspond to approved shop drawings.
- e. Verifying tightness of accessible bolted electrical connections by calibrated torque-wrench method or performing thermographic survey after energization.
- f. Confirm correct operation and sequencing of key-type mechanical interlock systems.
- g. Vacuum-clean switchboard enclosure interior. Clean switchboard enclosure exterior.
- h. Inspect insulators for evidence of physical damage or contaminated surfaces.

- i. Verify correct shutter installation and operation.
 - j. Exercise all active components.
 - k. Verify the correct operation of all sensing devices, alarms, and indicating devices.
 - l. Verify that vents are clear.
2. Electrical tests:
- a. Perform insulation-resistance tests on each bus section.
 - b. Perform insulation-resistance test on control wiring; do not perform this test on wiring connected to solid-state components.
 - c. Perform phasing check on double-ended switchboards to ensure correct bus phasing from each source.
- B. Prior to the final inspection for acceptance, a technical representative from the electric utility company shall witness the testing of the equipment to assure the proper operation of the individual components, and to confirm proper operation/coordination with electric utility company's equipment.

3.3 FOLLOW-UP VERIFICATION

- A. Upon completion of acceptance checks, settings, and tests, the Contractor shall show by demonstration in service that the switchboard is in good operating condition and properly performing the intended function.

3.4 WARNING SIGN

- A. Mount on each entrance door of the switchboard room, approximately 1500 mm (5 feet) above grade or floor, a clearly lettered warning sign for warning personnel. The sign shall be attached with rustproof metal screws.

3.5 ONE LINE DIAGRAM AND SEQUENCE OF OPERATION

- A. At final inspection, an as-built one line diagram shall be laminated or mounted under acrylic glass and installed in a frame mounted in the switchboard room or in the outdoor switchboard enclosure.
- B. Deliver an additional four copies of the as-built one line diagram to the COR.

3.6 AS-LEFT TRIP UNIT SETTINGS

- A. The trip unit settings shall be set in the field by an authorized representative of the switchboard manufacturer per the approved Electrical System Protective Device Study in accordance with Section 26 05 73, OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY.
- B. The trip unit settings of the main breaker(s) shall be reviewed by the electric utility company to assure coordination with the electric utility company primary fusing. Prior to switchboard activation, provide written verification of this review to the COR.

3.7 INSTRUCTION

- A. Furnish the services of a factory-trained technician for one, 4-hour training period for instructing personnel in the maintenance and operation of the switchboards, on the dates requested by the COR.

END OF SECTION

Request for Taxpayer Identification Number and Certification

Give Form to the
requester. Do not
send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)		
Business name/disregarded entity name, if different from above		
Check appropriate box for federal tax classification: <input type="checkbox"/> Individual/sole proprietor <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ► _____ <input type="checkbox"/> Other (see instructions) ► _____		Exemptions (see instructions): <input type="checkbox"/> Exempt payee code (if any) _____ <input type="checkbox"/> Exemption from FATCA reporting code (if any) _____
Address (number, street, and apt. or suite no.)	Requester's name and address (optional)	
City, state, and ZIP code		
List account number(s) here (optional)		

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number											
			-			-					

Employer identification number												
			-									

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below), and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ►	Date ►
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. The IRS has created a page on IRS.gov for information about Form W-9, at www.irs.gov/w9. Information about any future developments affecting Form W-9 (such as legislation enacted after we release it) will be posted on that page.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, payments made to you in settlement of payment card and third party network transactions, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the

withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity,
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust, and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS a percentage of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* on page 1.

What is FATCA reporting? The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account, for example, if the grantor or a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name/disregarded entity name" line.

Partnership, C Corporation, or S Corporation. Enter the entity's name on the "Name" line and any business, trade, or "doing business as (DBA) name" on the "Business name/disregarded entity name" line.

Disregarded entity. For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulation section 301.7701-2(c)(2)(iii). Enter the owner's name on the "Name" line. The name of the entity entered on the "Name" line should never be a disregarded entity. The name on the "Name" line must be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on the "Name" line. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on the "Business name/disregarded entity name" line. If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Note. Check the appropriate box for the U.S. federal tax classification of the person whose name is entered on the "Name" line (Individual/sole proprietor, Partnership, C Corporation, S Corporation, Trust/estate).

Limited Liability Company (LLC). If the person identified on the "Name" line is an LLC, check the "Limited liability company" box only and enter the appropriate code for the U.S. federal tax classification in the space provided. If you are an LLC that is treated as a partnership for U.S. federal tax purposes, enter "P" for partnership. If you are an LLC that has filed a Form 8832 or a Form 2553 to be taxed as a corporation, enter "C" for C corporation or "S" for S corporation, as appropriate. If you are an LLC that is disregarded as an entity separate from its owner under Regulation section 301.7701-3 (except for employment and excise tax), do not check the LLC box unless the owner of the LLC (required to be identified on the "Name" line) is another LLC that is not disregarded for U.S. federal tax purposes. If the LLC is disregarded as an entity separate from its owner, enter the appropriate tax classification of the owner identified on the "Name" line.

Other entities. Enter your business name as shown on required U.S. federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name/disregarded entity name" line.

Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the *Exemptions* box, any code(s) that may apply to you. See *Exempt payee code* and *Exemption from FATCA reporting code* on page 3.

Exempt payee code. Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends. Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

The following codes identify payees that are exempt from backup withholding:

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney, and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Reg. section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Reg. section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on page 2), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on the "Name" line must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. **Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.

2. **Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. **Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.

4. **Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. **Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ³
5. Sole proprietorship or disregarded entity owned by an individual	The actual owner ⁴
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulation section 1.671-4(b)(2)(i)(A))	The owner ⁵
7. Disregarded entity not owned by an individual	The grantor ⁶
For this type of account:	Give name and EIN of:
8. A valid trust, estate, or pension trust	The owner
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	Legal entity ⁷
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The corporation
11. Partnership or multi-member LLC	The organization
12. A broker or registered nominee	The partnership
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The broker or nominee
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulation section 1.671-4(b)(2)(i)(B))	The public entity
	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or "DBA" name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 1.

⁵ Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

**INSTRUCTIONS FOR COMPLETING THE NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE FOR PROFIT CONSTRUCTION**

Please Read Before Completing Questionnaire

- Complete all sections of the Questionnaire.
- Submit this form as required by the contracting agency after being announced the low bidder for any competitively bid contract, or when proposed for subcontract work. If you have submitted one within six (6) months of the bid date with any contracting agency, as long as the information remains unchanged and accurate, you may submit a complete certified copy of that form, together with an Affidavit of No Change, to the Agency with which you are bidding. A contracting agency may require additional information deemed necessary for its review. Whenever more space is needed to answer any question or you wish to give further explanation, complete by attaching extra pages. All questions must be answered.
- For each "Yes" answer in Sections IV, V, VI, VII, VII and IX, add additional explanatory material. For question 7.2, if your firm has OSHA citations, attach copies of each citation.
- A certified annual financial statement, including Accountant's Review Report and Accompanying Notes, will be acceptable in lieu of completing the financial disclosure forms in the questionnaire.
- If you wish material in this Questionnaire to be held as confidential and exempt from disclosure under Freedom of Information, place an asterisk in front of all information you do not want disclosed to outside sources.
- This Questionnaire is generally valid for one calendar year, unless major changes have occurred (firm purchased by another business, bankruptcy, etc.), in which case re-submittal is required.
- Submit completed questionnaires marked "CONFIDENTIAL" to:

**NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CONTRACT MANAGEMENT BUREAU
50 WOLF ROAD, 1st FLOOR, SUITE 1CM
ALBANY, NY 12232
(518) 457-1564**

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

BUSINESS ENTITY INFORMATION				
<u>Legal Business Name*</u>		<u>EIN</u>		
<u>Complete Address of the Principal Place of Business</u>		<u>Phone Number</u>	<u>Fax Number</u>	
<u>E-mail</u>		<u>Website</u>		
Authorized Contact for this Questionnaire				
<u>Name</u>		<u>Phone Number</u>	<u>Fax Number</u>	
<u>Title</u>		<u>E-mail</u>		
<u>Additional Business Entity Identities:</u> If applicable, list any other <u>DBA</u> , <u>Trade Name</u> , <u>Former Name</u> , <u>Other Identity</u> , or <u>EIN</u> used in the last five (5) years, the state or county where filed and the status (active or inactive).				
Type (DBA, Trade Name, Other)	Name	EIN	State or County where filed	Status (ACTIVE OR INACTIVE)
SELECT				SELECT
SELECT				SELECT

I. BUSINESS CHARACTERISTICS			
1.0 Business Entity Type -			
a) <input type="checkbox"/>	<u>Corporation (including P.C.)</u>	<u>Date of Incorporation</u>	
b) <input type="checkbox"/>	<u>Limited Liability Company (LLC or PLLC)</u>	<u>Date Organized</u>	
c) <input type="checkbox"/>	<u>Limited Liability Partnership</u>	<u>Date of Registration</u>	
d) <input type="checkbox"/>	<u>Limited Partnership</u>	<u>Date Established</u>	
e) <input type="checkbox"/>	<u>General Partnership</u>	<u>Date Established</u>	<u>County (or formed in NYS)</u>
f) <input type="checkbox"/>	<u>Sole Proprietor</u>	<u>How many years in business?</u>	
g) <input type="checkbox"/>	<u>Other</u>	<u>Date Established</u>	
If Other, explain:			
1.1 Was the Business Entity formed in New York State?		<u>Yes</u> <input type="checkbox"/>	<u>No</u> <input type="checkbox"/>
If "No" indicate jurisdiction where the Business Entity was formed: United States <input type="checkbox"/> State Other <input type="checkbox"/> Country			

*All underlined terms are defined in the "New York State Vendor Responsibility Definitions List", which can be found at:
<http://www.osc.state.ny.us/vendrep/documents/definitions.pdf>.

Note: These terms may not have their ordinary, common or traditional meanings. Each vendor is strongly encouraged to read the respective definitions for any and all underlined terms. By submitting this questionnaire, the vendor agrees to be bound by the terms as defined in the "New York State Vendor Responsibility Definitions List" as it existed at the time of certifications.

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

I. BUSINESS CHARACTERISTICS			
1.2 Is the <u>Business Entity</u> currently registered to do business in New York State? <i>Note: Select "Not Required" if the Business Entity is a Sole Proprietor or General Partnership</i>			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required
If "No," explain why the <u>Business Entity</u> is not required to be registered to do business in New York State:			
1.3 Is the responding <u>Business Entity</u> a <u>Joint Venture</u> ? Note: If the submitting <u>Business Entity</u> is a <u>Joint Venture</u> , also submit a separate questionnaire for each <u>Business Entity</u> comprising the <u>Joint Venture</u> .			<input type="checkbox"/> Yes <input type="checkbox"/> No
1.4 If the <u>Business Entity's Principal Place of Business</u> is not in New York State, does the <u>Business Entity</u> maintain an office in New York State? <i>(Select "N/A" if Principal Place of Business is in New York State.)</i>			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If "Yes," provide the address and telephone number for one office located in New York State.			
1.5 Is the <u>Business Entity</u> a New York State certified <u>Minority-Owned Business Enterprise</u> , or <u>Women-Owned Business Enterprise</u> , or <u>New York State Small Business</u> , or federally certified <u>Disadvantaged Business Enterprise</u> ?			<input type="checkbox"/> Yes <input type="checkbox"/> No
If "Yes," check all that apply: <input type="checkbox"/> New York State certified <u>Minority-Owned Business Enterprise (MBE)</u> <input type="checkbox"/> New York State certified <u>Women-Owned Business Enterprise (WBE)</u> <input type="checkbox"/> <u>New York State Small Business</u> <input type="checkbox"/> Federally certified <u>Disadvantaged Business Enterprise (DBE)</u>			
1.6 Identify each person who is, or has been within the past five (5) years, a <u>Business Entity Official</u> or <u>Principal Owner</u> of 5.0% or more of the firm's shares, or one of the five largest shareholders or a director, an officer, a partner or a proprietor. <u>Joint Ventures:</u> Provide information for all firms involved. <i>(Attach additional pages if necessary.)</i>			
Name	Title	Percentage Ownership <i>(Enter 0% if not applicable)</i>	Employment Status with the Firm
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former
			<input type="checkbox"/> Current <input type="checkbox"/> Former
II. AFFILIATE and JOINT VENTURE RELATIONSHIPS			
2.0 Are there any other construction-related firms in which, now or in the past five years, the submitting <u>Business Entity</u> or any of the individuals listed in question 1.6 either owned or owns 5.0% or more of the shares of, or was or is one of the five largest shareholders or a director, officer, partner or proprietor of said other firm?			<input type="checkbox"/> Yes <input type="checkbox"/> No
Firm/Company Name	Firm/Company EIN <i>(If Available)</i>	Firm/Company's Primary Business Activity	

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

II. AFFILIATE and JOINT VENTURE RELATIONSHIPS		
Firm/Company Address		
Explain relationship with the firm and indicate percent ownership, if applicable (enter N/A, if not applicable):		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting Business Entity has in common with this affiliate?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Individual's Name	Position/Title with Firm/Company	
2.1 Does the <u>Business Entity</u> have any <u>construction-related affiliates</u> not identified in the response to 2.0 above?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Affiliate Name	Affiliate EIN (If available)	Affiliate's Primary Business Activity
Affiliate Address		
Explain relationship with the affiliate and indicate percent ownership, if applicable (enter N/A, if not applicable):		
Are there any shareholders, directors, officers, owners, partners or proprietors that the submitting Business Entity has in common with this firm?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Individual's Name	Position/Title with Firm/Company	
2.2 Has the <u>Business Entity</u> participated in any <u>construction Joint Ventures</u> within the past three (3) years? <i>Attach additional pages if necessary.</i>		<input type="checkbox"/> Yes <input type="checkbox"/> No
Joint Venture Name	Joint Venture EIN (If available)	Identify parties to the Joint Venture

III. CONTRACT HISTORY		
3.0 List the ten most recent <u>construction contracts</u> the <u>Business Entity</u> has completed using Attachment A – Completed Construction Contracts, found at http://www.osc.state.ny.us/vendrep/documents/attachmenta.doc . If less than ten, include most recent subcontracts up to that number.		
3.1 List all current uncompleted <u>construction contracts</u> by using Attachment B – Uncompleted Construction Contracts, found at http://www.osc.state.ny.us/vendrep/documents/attachmentb.doc .		

IV. INTEGRITY – CONTRACT BIDDING		
Within the past five (5) years, has the <u>Business Entity</u> , an affiliate or any predecessor company or entity:		
4.0 Been <u>suspended or debarred from any government contracting process</u> or been <u>disqualified</u> on any government procurement?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4.1 Been subject to a denial or revocation of a government prequalification?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4.2 Had any bid rejected by a <u>government entity</u> for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4.3 Had a proposed subcontract rejected by a <u>government entity</u> for lack of qualifications, responsibility or because of the submission of an informal, non-responsive or incomplete bid?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4.4 Had a low bid rejected on a <u>government contract</u> for failure to make <u>good faith efforts</u> on any <u>Minority-Owned Business Enterprise</u> , <u>Women-Owned Business Enterprise</u> or <u>Disadvantaged Business Enterprise</u> goal or statutory affirmative action requirements on a previously held contract?		<input type="checkbox"/> Yes <input type="checkbox"/> No

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

IV. INTEGRITY – CONTRACT BIDDING Within the past five (5) years, has the Business Entity, an affiliate or any predecessor company or entity:	
4.5 Agreed to a voluntary exclusion from bidding/contracting with a <u>government entity</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4.6 Initiated a request to withdraw a bid submitted to a <u>government entity</u> or made any claim of an error on a bid submitted to a <u>government entity</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>For each "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, the <u>government entity</u> involved, project(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.</i>	

V. INTEGRITY – CONTRACT AWARD Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:	
5.0 Defaulted on or been <u>suspended</u> , cancelled or <u>terminated for cause</u> on any contract?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.1 Been subject to an <u>administrative proceeding</u> or civil action seeking specific performance or restitution (except any disputed work proceeding) or requiring the <u>Business Entity</u> to enter into a formal monitoring agreement in connection with any <u>government contract</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.2 Had its surety called upon to complete any contract whether government or private sector?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>For each "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, the <u>government entity</u>/owners involved, project(s), contract number(s), relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.</i>	

VI. CERTIFICATIONS/LICENSES Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:	
6.0 Had a revocation or <u>suspension</u> of any business or professional permit and/or license?	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.1 Had a denial, decertification, revocation or forfeiture of New York State certification of <u>Minority-Owned Business Enterprise</u> , <u>Women-Owned Business Enterprise</u> or a <u>federal</u> certification of <u>Disadvantaged Business Enterprise</u> status, for other than a change of ownership?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>For each "Yes," provide an explanation of the issue(s), the <u>Business Entity</u> involved, the relationship to the submitting <u>Business Entity</u>, the <u>government entity</u> involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.</i>	

VII. LEGAL PROCEEDINGS Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:	
7.0 Been the subject of a criminal <u>investigation</u> , whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or <u>federal</u> law?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.1 Been the subject of: (i) An indictment, grant of immunity, <u>judgment</u> or conviction (including entering into a plea bargain) for conduct constituting a crime; or (ii) Any criminal <u>investigation</u> , felony indictment or conviction concerning the formation of, or any business association with, an allegedly false or fraudulent <u>Minority-Owned Business Enterprise</u> , <u>Women-Owned Business Enterprise</u> , or a <u>Disadvantaged Business Enterprise</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
7.2 Received any OSHA citation and Notification of Penalty containing a violation classified as <u>serious</u> or <u>willful</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

VII. LEGAL PROCEEDINGS	
Within the past five (5) years, has the Business Entity, an affiliate, or any predecessor company or entity:	
7.3 Had a <u>government entity</u> find a willful prevailing wage or supplemental payment violation?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.4 Had a New York State Labor Law violation deemed willful?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.5 Entered into a consent order with the New York State Department of Environmental Conservation, or a <u>federal</u> , state or local government enforcement determination involving a violation of <u>federal</u> , state or local environmental laws?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.6 Other than previously disclosed, been the subject of any <u>citations, notices, violation orders, pending administrative hearings or proceedings or determinations of a violation of:</u>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
<i>For each "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.</i>	

VIII. LEADERSHIP INTEGRITY	
If the Business Entity is a Joint Venture Entity, answer "N/A - Not Applicable" to questions in this section.	
Within the past five (5) years has any individual previously identified or any individual having the authority to sign, execute or approve bids, proposals, contracts or supporting documentation on behalf of the Business Entity with New York State been subject to:	
8.0 A <u>sanction</u> imposed relative to any business or professional permit and/or license?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.1 A criminal <u>investigation</u> , whether open or closed, or an indictment for any business-related conduct constituting a crime under local, state or <u>federal</u> law?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.2 Misdemeanor or felony charge, indictment or conviction for: (i) Any business-related activity including but not limited to fraud, coercion, extortion, bribe or bribe-receiving, giving or accepting unlawful gratuities, immigration or tax fraud, racketeering, mail fraud, wire fraud, price-fixing or collusive bidding; or (ii) Any crime, whether or not business-related, the underlying conduct of which related to truthfulness, including but not limited to the filing of false documents or false sworn statements, perjury or larceny?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
8.3 A <u>debarment</u> from any <u>government contracting process</u> ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<i>For each "Yes," provide an explanation of the issue(s), the individual involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer(s) below or attach additional sheets with numbered responses.</i>	

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

IX. FINANCIAL AND ORGANIZATIONAL CAPACITY

9.0 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> received any <u>formal unsatisfactory performance assessment(s)</u> from any <u>government entity</u> on any contract?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, the government entity involved, relevant dates, any remedial or corrective action(s) taken and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.1 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> had any <u>liquidated damages</u> assessed over \$25,000?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the contracting party involved, the amount assessed and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.2 Within the past five (5) years, has the <u>Business Entity</u> or any <u>affiliate</u> had any <u>liens, claims or judgments</u> (not including UCC filings) over \$25,000 filed against the <u>Business Entity</u> which remain undischarged or were unsatisfied for more than 90 days?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the Lien holder or Claimants' name(s), the amount of the lien(s) and the current status of the issue(s). Provide answer below or attach additional sheets with numbered responses.</i>		
9.3 In the last seven (7) years, has the <u>Business Entity</u> or any <u>affiliate</u> initiated or been the subject of any <u>bankruptcy proceedings</u> , whether or not closed, or is any <u>bankruptcy proceeding pending</u> ?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>If "Yes," provide the Business Entity involved, the relationship to the submitting Business Entity, the bankruptcy chapter number, the court name and the docket number. Indicate the current status of the proceedings as "Initiated," "Pending" or "Closed." Provide answer below or attach additional sheets with numbered responses.</i>		
9.4 What is the <u>Business Entity's Bonding Capacity</u> ?		
a. Single Project		b. Aggregate (All Projects)
9.5 List <u>Business Entity's Gross Sales</u> for the previous three (3) Fiscal Years:		
1st Year (Indicate year) Gross Sales	2nd Year (Indicate year) Gross Sales	3rd Year (Indicate year) Gross Sales
9.6 List <u>Business Entity's Average Backlog</u> for the previous three (3) fiscal years: (Estimated total value of uncompleted work on outstanding contracts)		
1st Year (Indicate year) Amount	2nd Year (Indicate year) Amount	3rd Year (Indicate year) Amount
9.7 Attach <u>Business Entity's annual financial statement</u> and accompanying notes or complete Attachment C – Financial Information, found at http://www.osc.state.ny.us/vendrep/documents/attachmentc.xls		

X. FREEDOM OF INFORMATION LAW (FOIL)

10.0 Indicate whether any information provided herein is believed to be exempt from disclosure under the Freedom of Information Law (FOIL).		<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>Note: A determination of whether such information is exempt from FOIL will be made at the time of any request for disclosure under FOIL. Attach additional pages if necessary.</i>		

Indicate the question number(s) and explain the basis for the claim.

**NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
FOR PROFIT CONSTRUCTION (CCA-2)**

EIN:

Certification

The undersigned: (1) recognizes that this questionnaire is submitted for the express purpose of assisting New York State contracting entities in making responsibility determinations regarding an award of a contract or approval of a subcontract; (2) recognizes that the Office of the State Comptroller (OSC) will rely on information disclosed in the questionnaire in making responsibility determinations and in approving a contract or subcontract; (3) acknowledges that the New York State contracting entities and OSC may, in their discretion, by means which they may choose, verify the truth and accuracy of all statements made herein; and (4) acknowledges that intentional submission of false or misleading information may constitute a misdemeanor or felony under New York State Penal Law, may be punishable by a fine and/or imprisonment under Federal Law, and may result in a finding of non-responsibility, contract suspension or contract termination.

The undersigned certifies that he/she:

- is knowledgeable about the submitting Business Entity's business and operations;
- has read and understands all of the questions contained in the questionnaire;
- has not altered the content of the questionnaire in any manner;
- has reviewed and/or supplied full and complete responses to each question;
- to the best of his/her knowledge, information and belief, confirms that the Business Entity's responses are true, accurate and complete, including all attachments, if applicable;
- understands that New York State will rely on the information disclosed in the questionnaire when entering into a contract with the Business Entity; and
- is under obligation to update the information provided herein to include any material changes to the Business Entity's responses at the time of bid/proposal submission through the contract award notification, and may be required to update the information at the request of the New York State contracting entities or OSC prior to the award and/or approval of a contract, or during the term of the contract.

Signature of Owner/Officer _____

Printed Name of Signatory _____

Title _____

Name of Business _____

Address _____

City, State, Zip _____

Sworn to before me this _____ day of _____, 20____;

Notary Public

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT A - COMPLETED CONSTRUCTION CONTRACTS

EIN:

Question 3.0: List the ten most recent construction contracts the Business Entity has completed. If less than ten, include most recent subcontractor projects up to that number.					
1.	Agency/Owner			Award Date	Amount
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
2.	Agency/Owner			Award Date	Amount
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
3.	Agency/Owner			Award Date	Amount
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
4.	Agency/Owner			Award Date	Amount
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
5.	Agency/Owner			Award Date	Amount
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT A - COMPLETED CONSTRUCTION CONTRACTS

EIN:

Question 3.0: List the ten most recent construction contracts the Business Entity has completed. If less than ten, include most recent subcontracts on projects up to that number.					
6.	Agency/Owner		Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
7.	Agency/Owner		Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
8.	Agency/Owner		Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
9.	Agency/Owner		Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable
10.	Agency/Owner		Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer	
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable		EIN of JV, if applicable

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B - UNCOMPLETED CONSTRUCTION CONTRACTS

EIN:

Question 3.1: List all current uncompleted construction contracts.

1.	Agency/Owner			Award Date	Amount	Date Completed
Contact Person		Telephone No.	Design Architect and/or Design Engineer			
Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
		Total Contract Amount	Amount Sublet to Others		Uncompleted Amount	
2.	Agency/Owner			Award Date	Amount	Date Completed
Contact Person		Telephone No.	Design Architect and/or Design Engineer			
Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
		Total Contract Amount	Amount Sublet to Others		Uncompleted Amount	
3.	Agency/Owner			Award Date	Amount	Date Completed
Contact Person		Telephone No.	Design Architect and/or Design Engineer			
Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
		Total Contract Amount	Amount Sublet to Others		Uncompleted Amount	
4.	Agency/Owner			Award Date	Amount	Date Completed
Contact Person		Telephone No.	Design Architect and/or Design Engineer			
Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable	
		Total Contract Amount	Amount Sublet to Others		Uncompleted Amount	

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B - UNCOMPLETED CONSTRUCTION CONTRACTS

EIN:

Question 3.1: List all current uncompleted construction contracts.

5.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	
6.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	
7.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	
8.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT B - UNCOMPLETED CONSTRUCTION CONTRACTS

EIN:

Question 3.1: List all current uncompleted construction contracts.						
9.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	
10.	Agency/Owner			Award Date	Amount	Date Completed
	Contact Person		Telephone No.	Design Architect and/or Design Engineer		
	Contract No.	Prime or Sub	Joint Venture (JV) Name, if applicable			EIN of JV, if applicable
			Total Contract Amount	Amount Sublet to Others	Uncompleted Amount	

	Grand Total All Uncompleted Contracts	\$0.00
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NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C – FINANCIAL INFORMATION

EIN:
As of Date:

ASSETS

Current Assets

1.	<u>Cash</u>	\$	
2.	<u>Accounts receivable – less allowance for doubtful accounts</u>	\$	
	Retainers included in accounts receivable		
	Claims included in accounts receivable not yet approved or in litigation		
	Total accounts receivable	\$	0.00
3.	<u>Notes receivable – due within one year</u>	\$	
4.	<u>Inventory – materials</u>	\$	
5.	<u>Contract costs in excess of billings on uncompleted contracts</u>	\$	
6.	<u>Accrued income receivable</u>	\$	
	Interest		
	Other (list)		
	Total accrued income receivable	\$	0.00
7.	<u>Deposits</u>	\$	
	Bid and plan		
	Other (list)		
	Total deposits	\$	0.00
8.	<u>Prepaid expenses</u>	\$	
	Income Taxes		
	Insurance		
	Other (List)		
	Total prepaid expenses	\$	0.00
9.	<u>Other current assets</u>	\$	
	(List)		
	Total other current assets	\$	0.00
10.	<u>Total current assets</u>	\$	0.00

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C – FINANCIAL INFORMATION

EIN:

11.	<u>Investments</u>	
	Listed securities present market value	\$
	Unlisted securities present value	
12.	Total investments	\$ 0.00
	<u>Fixed Assets</u>	
	Land	
	Building and improvements	
	Leasehold improvements	
	Machinery and equipment	
	Automotive equipment	
	Office furniture and fixtures	
	Other (list)	
	Total	\$ 0.00
	Less: accumulated depreciation	\$
13.	Total fixed assets net	\$ 0.00
	<u>Other Assets</u>	
	Loans receivable	
	officers	
	employees	
	shareholders	
	Cash surrender value of officers' life insurance	
	Organization expense – net of amortization	
	Notes receivable – due after one year	
	Other (list)	
14.	Total Other Assets	\$ 0.00
	<u>TOTAL ASSETS</u>	\$ 0.00

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C – FINANCIAL INFORMATION

EIN:

LIABILITIES

Current Liabilities

15.	Accounts payable	\$	
16.	Loans from shareholders – due within one year	\$	
17.	Notes payable – due within one year	\$	
18.	Mortgage payable – due within one year	\$	
19.	Other payables – due within one year (List)	\$	
20.	Total other payables – due within one year	0.00	
21.	Billings in excess of costs and estimated earnings	\$	
	Accrued expenses payable Salaries and wages	\$	
	Employees' benefits	\$	
	Insurance	\$	
	Other	\$	
22.	Total accrued expenses payable	0.00	
23.	Dividends payable	\$	
	Income taxes payable State	\$	
	Federal	\$	
	Other	\$	
24.	Total income taxes payable	0.00	
25.	Total Current Liabilities	\$	0.00
	Deferred Income Taxes	\$	
	Payable State	\$	
	Federal	\$	
	Other	\$	
	Total deferred income taxes	\$	0.00

NEW YORK STATE VENDOR RESPONSIBILITY QUESTIONNAIRE
ATTACHMENT C – FINANCIAL INFORMATION

EIN:

26.	<u>Long Term Liabilities</u>					
	Loans from shareholders – due after one year					
	Notes payable – due after one year					
	Mortgage – due after one year					
	Other payables – due after one year					
	(List)					
27.	Total long term liabilities		\$	0.00		
	<u>Other Liabilities</u>					
	(List)					
28.	Total other liabilities		\$	0.00		
	<u>TOTAL LIABILITIES</u>				\$	0.00
29.	Net Worth (if proprietorship or partnership)					
30.	Stockholders' Equity		\$			
	Common stock issued and outstanding					
	Preferred stock issued and outstanding					
	Retained earnings					
	Total		\$	0.00		
	Less: Treasury Stock					
31.	TOTAL STOCKHOLDERS EQUITY					
32.	TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY				\$	0.00
					\$	0.00

ONLY ONCE

M/WBE UTILIZATION PLAN

INSTRUCTIONS: This form must be submitted with any bid, proposal, or proposed negotiated contract or within a reasonable time thereafter, but prior to contract award. This Utilization Plan must contain a detailed description of the supplies and/or services to be provided by each certified Minority and Women-owned Business Enterprise (M/WBE) under the contract. Note – A dually certified firm cannot be counted toward both the MBE and WBE participation goals. Attach additional sheets if necessary.

Offeror's Name:

Address:

City, State, Zip Code:

Telephone No.:

Region/Location of Work:

Federal Identification No.:

Solicitation Name/Contract No.:

MWBE Certified No

M/WBE Goals in Contract: MBE%

WBE %

1. Certified M/WBE Subcontractors/Suppliers Name, Address, Email Address, Telephone No.	2. Classification	3. Federal ID No.	4. Detailed Description of Work (Attach additional sheets, if necessary)	5. Dollar Value of Subcontracts/ Supplies/Services and intended performance dates of each component of the contract.
A.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
B.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			

6. IF UNABLE TO FULLY MEET THE MBE AND WBE GOALS SET FORTH IN THE CONTRACT, OFFEROR MUST SUBMIT A REQUEST FOR WAIVER FORM - OTDA - 4969.

PREPARED BY

(Signature): DATE:

NAME AND TITLE OF PREPARER (Print or Type):

TELEPHONE NO.:

EMAIL ADDRESS:

FOR M/WBE USE ONLY

REVIEWED BY:

DATE:

UTILIZATION PLAN APPROVED: YES NO Date:
Contract No.:

Contract Award Date:

Estimated Date of Completion:

Amount Obligated Under the Contract:

Description of Work:

NOTICE OF DEFICIENCY ISSUED:

YES NO Date: _____

NOTICE OF ACCEPTANCE ISSUED:

YES NO Date: _____

SUBMISSION OF THIS FORM CONSTITUTES THE OFFEROR'S ACKNOWLEDGEMENT AND AGREEMENT TO COMPLY WITH THE M/WBE REQUIREMENTS SET FORTH UNDER NYS EXECUTIVE LAW, ARTICLE 15-A, 5 NYCRR PART 143, AND THE ABOVE-REFERENCED SOLICITATION. FAILUR TO SUBMIT COMPLETE AND ACCURATE INFORMATION MAY RESULT IN A FINDING OF NONCOMPLIANCE AND POSSIBLE TERMINATION OF YOUR CONTRACT.

_____ is designated as the Minority Business Enterprise Liaison

He/she is responsible for administering the Minority and Women-Owned Business Enterprises-Equal Employment Opportunity (M/WBE-EEO) program.

M/WBE Contract Goals

30% Minority and Women's Business Enterprise Participation

15% Minority Business Enterprise Participation

15% Women's Business Enterprise Participation

EEO Contract Goals

 % Minority Labor Force Participation

 % Female Labor Force Participation

MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES – EQUAL EMPLOYMENT OPPORTUNITY POLICY STATEMENT

M/WBE AND EEO POLICY STATEMENT

I, _____, the (awardee/contractor) _____ agree to adopt the following policies with respect to the project being developed or services rendered for (name agency/ies or project location) _____

MWBE

This organization will and will cause its contractors and subcontractors to take good faith actions to achieve the M/WBE contract participation goals set by the State for that area in which the State-funded project is located, by taking the following steps:

- (1) Actively and affirmatively solicit bids for contracts and subcontracts from qualified State certified MBEs or WBEs, including solicitations to M/WBE contractor associations.
- (2) Request a list of State-certified M/WBEs from Agency(ies) and solicit bids from them directly.
- (3) Ensure that plans, specifications, request for proposals and other documents used to secure bids will be made available in sufficient time for review by prospective M/WBEs.
- (4) Where feasible, divide the work into smaller portions to enhance participations by M/WBEs and encourage the formation of joint venture and other partnerships among M/WBE contractors to enhance their participation.
- (5) Document and maintain records of bid solicitation, including those to M/WBEs and the results thereof. Contractor will also maintain records of actions that its subcontractors have taken toward meeting M/WBE contract participation goals.
- (6) Ensure that progress payments to M/WBEs are made on a timely basis so that undue financial hardship is avoided, and that bonding and other credit requirements are waived or appropriate alternatives developed to encourage M/WBE participation.

EEO

- (a) This organization will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability or marital status, will undertake or continue existing programs of affirmative action to ensure that minority group members are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State contracts.
- (b) This organization shall state in all solicitation or advertisements for employees that in the performance of the State contract all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, disability or marital status.
- (c) At the request of the contracting agency, this organization shall request each employment agency, labor union, or authorized representative for a statement that it will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of this organization's obligations herein.
- (d) Contractor shall comply with the provisions of the Human Rights Law, all other State and Federal statutory and constitutional non-discrimination provisions. Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.
- (e) This organization will include the provisions of sections (a) through (d) of this agreement in every subcontract in such a manner that the requirements of the subdivisions will be binding upon each subcontractor as to work in connection with the State contract.

Agreed to this _____ day of _____, 20_____

By _____

Print: _____ Title: _____



New York State
Homes & Community Renewal
www.nyshcr.org

EEOC Statement
of the
New York State Housing Finance Agency,
State of New York Mortgage Agency,
New York State Affordable Housing Corporation,
State of New York Municipal Bond Bank Agency,
Tobacco Settlement Financing Corporation and
Housing Trust Fund Corporation
(individually, "Agency" and collectively, "Agencies")

It is the goal of the Agencies to ensure compliance with the federal Equal Employment Opportunity Act of 1972, as amended. Respondents with fifteen (15) or more employees responding to this solicitation, must submit a statement disclosing whether the Respondent: (a) is currently operating under or negotiating, or has at some time in the last five (5) years operated under or negotiated, a conciliation agreement with the Equal Employment Opportunity Commission ("EEOC"); (b) has been, at some time in the last five (5) years, or is currently the subject of a civil action brought against it by the EEOC; (c) has been, at some time in the last five (5) years, or is currently the subject of an action brought against it by the EEOC for permanent, temporary or preliminary relief; (d) has operated, at some time in the last five (5) years, or is currently operating under an order of a court to take affirmative action as a result of a civil action brought against it by the EEOC.

Please answer the above question either in the affirmative or negative.

Respond YES or NO.

If YES, provide explanation:

Respondent's Signature

Date of Respondent's Signature

Print Name of Respondent

WITH EVERY PAYMENT

EQUAL EMPLOYMENT OPPORTUNITY - STAFFING PLAN

Instructions on Page 2

Bidder Name: _____

Telephone: _____

Address: _____

Federal ID No.: _____

City, State, ZIP: _____

Solicitation No.: _____

Report includes:

Reporting Entity:

- Work force to be utilized on this contract
- Contractor/Subcontractor's total work force

Contractor

Subcontractor - Name: _____

Enter the total number of employees in each classification in each of the EEO-Job Categories identified.

EEO - Job Categories	Total Work Force	Race/Ethnicity - report employees in only one category														
		Hispanic or Latino		Male						Not-Hispanic or Latino						
		Male	Female	White	African-American or Black	Native Hawaiian or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races	Disabled	Veteran	White	African-American or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races
Executive/Senior Level Officials and Managers																
First/Mid-Level Officials and Managers																
Professionals																
Technicians																
Sales Workers																
Administrative Support Workers																
Craft Workers																
Operatives																
Laborers and Helpers																
Service Workers ¹																
TOTAL																

PREPARED BY (Signature): _____

DATE: _____

NAME AND TITLE OF
PREPARER: _____

TELEPHONE/EMAIL: _____

(print or type)

STAFFING PLAN INSTRUCTIONS

General Instructions: All Bidders and each subcontractor identified in the bid or proposal must complete an EEO Staffing Plan (EEO 100) and submit it as part of the bid or proposal package. Where the work force to be utilized in the performance of the State contract can be separated out from the contractor's or subcontractor's total work force, the Bidder shall complete this form only for the anticipated work force to be utilized on the State contract. Where the work force to be utilized in the performance of the State contract cannot be separated out from the contractor's or subcontractor's total work force, the Bidder shall complete this form for the contractor's or subcontractor's total work force.

Instructions for Completing:

1. Enter the Solicitation number that this report applies to, along with the name, address, and federal ID number of the Bidder.
2. Check off the appropriate box to indicate if the work force being reported is just for the contract or the Bidder's total work force.
3. Check off the appropriate box to indicate if the Bidder completing the report is the contractor or subcontractor.
4. Enter the total work force by EEO job category.
5. Break down the total work force by gender and race/ethnic background and enter under the heading Race/Ethnicity. Contact the Designated Contact(s) for the solicitation if you have any questions.
6. Enter the name, title, phone number and/or email address for the person completing the form. Sign and date the form in designated areas.

RACE/ETHNIC IDENTIFICATION

For purposes of this form NYSED will accept the definitions of race/ethnic designations used by the federal Equal Employment Opportunity Commission (EEOC), as those definitions are described below or amended hereafter. (Be advised these terms may be defined differently for other purposes under NYS statutory, regulatory, or case law). Race/ethnic designations as used by the EEOC do not denote scientific definitions of anthropological origins. For the purposes of this report, an employee may be included in the group to which he or she appears to belong, identifies with, or is regarded in the community as belonging. The race/ethnic categories for this survey are:

- Hispanic or Latino - A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.
- White (Not Hispanic or Latino) - A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- Black or African American (Not Hispanic or Latino) - A person having origins in any of the black racial groups of Africa.
- Native Hawaiian or Other Pacific Islander (Not Hispanic or Latino) - A person having origins in any of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- Asian (Not Hispanic or Latino) - A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- American Indian or Alaska Native (Not Hispanic or Latino) - A person having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.
- Two or More Races (Not Hispanic or Latino) - All persons who identify with more than one of the above five races.
- Disabled - Any person who has a physical or mental impairment that substantially limits one or more major life activity; has a record of such an impairment; or is regarded as having such an impairment
- Vietnam Era Veteran - a veteran who served at any time between and including January 1, 1963 and May 7, 1975.



Homes and
Community Renewal

New York State Homes & Community Renewal
Office of Economic Opportunity and Partnership Development
www.nyshcr.org/oeopd
Econ.Opportunity@nyshcr.org

AFFIRMATION OF INCOME PAYMENTS TO MBE/WBE and/or SDVOB

Each MWBE and/or SDVOB Firm must sign and submit this form to the Contractor. The Contractor/Vendor must submit this form to the Office of Economic Opportunity and Partnership Development by the 5th of each Quarter. Further, utilization of certified minority- and women-owned business enterprises and/or service-disable veteran owned businesses for non-commercially useful functions may not be counted towards utilization of certified minority and women-owned business enterprises and/or service-disable veteran owned businesses.

Contractor Information:			
1. Name and Address of Contractor:		2. Project Name or ID/SHARS#:	
3. Reporting Period (indicate quarter and year)			
Quarter:		Year:	
Federal ID#:			
Subcontractor Information:			
1. Name and Address of Contractor:		2. Date Contract Started:	
3. NYS Certified MWBE (check one, if applicable):			
<input type="checkbox"/> MBE		<input type="checkbox"/> WBE	
4. Is business a NYS Certified SDVOB?			
Federal ID#:		<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Type of Service Provider (Check one box only)			
<input type="checkbox"/> Construction		<input type="checkbox"/> Construction Consultant	
<input type="checkbox"/> Services		<input type="checkbox"/> Commodities	
6. Date(s) Work Performed for which MWBE and/or SDVOB was Paid This Quarter:			
7. Summary of Payments			
a. Total contract amount		\$	
b. Payment received for this reporting period		\$	
c. Total payments received as of this reporting period		\$	

Subcontractor Signature

Subcontractor Printed Name

Date

Contractor Signature

Contractor Printed Name

Date

FORM I
MONTHLY EMPLOYMENT UTILIZATION REPORT
(See Reverse Side for Instructions)
(DUE WITH EACH MONTHLY PAYMENT REQUEST)

Project:		1. Current Goals: Minority _____ Female _____		2. Reporting Period Mo. ____ Yr. ____		3. Start Date: _____ Est. Completion Date: _____											
Return To:		Name & Location of Contractor:								4. Percent of Job Completed							
5. Work Hours of Employment										Employee							
Classification	Sa. All Employees		Sb. Black		Sc. Hispanic		Sd. Asian or Pacific Islander		Se. American Indian/Alaskan Native		6. Minority	7. Female	8. Total		9. Minority		10. Construction Trades
	M	F	M	F	M	F	M	F	M	F	Percentage	Percentage	M	F	M	F	
Supervisory																	
Journey Worker																	
Apprentice																	
Trainee																	
Sub Total																	
Journey Worker																	
Apprentice																	
Trainee																	
Sub Total																	
Journey Worker																	
Apprentice																	
Trainee																	
Sub Total																	
TOTAL SUPERVISORS																	
TOTAL JOURNEY WORKERS																	
TOTAL APPRENTICES																	
TOTAL TRAINEES																	
GRAND TOTAL																	
11. Company Officials' Signature & Title:										12. Telephone Number (Include Area Code)				Date Signed			

INSTRUCTIONS FOR FILING MONTHLY EMPLOYMENT UTILIZATION REPORT - FORM I

The Monthly Employment Utilization Report is to be completed by each subject contractor (both Prime and Sub) and signed by a responsible official of the company. The reports are to be filed by the 5th day of each month during the term of the contract, and they shall include the total work hours for each employee classification in each trade in the covered area for the monthly reporting period. The prime contractor is responsible for submitting its subcontractors report, along with its own.

Minority	Includes Black, Hispanics, American Indians, Alaskan Natives and Asian and Pacific Islanders, both men and women.
1. Current Goals	As stated Bid Conditions.
2. Reporting Period	From the first to the end of the month. Due on the 5th day of the following month.
3. Estimated Completion Date	Best possible estimation.
4. Percent of job completed	% project work contractor or sub-contractor has completed.
5. Work-Hours of Employment	a. The total number of male hours and the total (a-e) number of female hours worked by employees in each classification. b.-e. The total number of male hours and the total number of female hours worked by each specified group of minority employees in each classification.
6. Minority Percentage	The percentage of total minority work-hours of all work-hours (the sum of columns 5b, 5c, 5d, and 5e divided by column 5a; just one figure for each construction trade).
7. Female Percentage	For each trade the number reported in 5a. (F) divided by the sum of the numbers reported in 5a. M and F.
8. Total Number of Employees.	Total number of male and total number of female employees working in each classification of each trade in the contractor's aggregate workforce during reporting period.
9. Total Number of Minority Employees	Total number of male minority employees and total number of female minority employees working in each classification in each trade in the contractor's aggregate workforce during reporting period.
10. Construction Trade	Only those construction crafts which contractor employs in the covered area.
11. and 12.	These items must be completed.

Contract and Subcontract Activity

U.S. Department of Housing and Urban Development

Public Reporting Burden for this collection of information is estimated to average .50 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the collection of information. This information is voluntary. HUD may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB Control Number.

Executive Order 12421 dated July 14, 1983, directs the Minority Business Development Plans shall be developed by each Federal Agency and that these annual plans shall establish minority business development and evaluate MBE activities against the total program activity and the designated minority business enterprise (MBE) goals. The Department requires the information to provide guidance and oversight for program concerning Minority Business Development. If the information is not collected HUD would not be able to establish meaningful MBE goals nor evaluate MBE performance against these goals.

While no assurances of confidentiality is pledged to respondents, HUD generally discloses this data only in response to a Freedom of Information request.

Privacy Act Notice - The United States Department of Housing and Urban Development, Federal Housing Administration, is authorized to solicit the information requested in this form by virtue of Title 12, United States Code, promulgated thereunder at Title 12, Code of Federal Regulations. It will not be disclosed or released outside the United States Department of Housing and Urban Development without your consent, except as required by law.

7c: Type of Trade Codes:

CPD:
1 = New Construction
2 = Education/Training
3 = Other

Housing/Public Housing:

1 = New Construction

2 = Substantial Rehab.

3 = Repair

4 = Service

5 = Project Mngt.

solete.

SOCIETY.

**6 = Professional
7 = Tenant Services
8 = Education/Training
9 = Arch./Engrg. Appraisal
0 = Other**

• 7d: Racial/Ethnic Codes

- 1 = White Americans
- 2 = Black Americans
- 3 = Native Americans
- 4 = Hispanic Americans
- 5 = Asian/Pacific Americans
- 6 = Hasidic Jews

5: Program Codes (Complete for Hc)

- 1 = All insured, including Section 8
- 2 = Flexible Subsidy
- 3 = Section 8 Noninsured, Non-HF
- 4 = Insured (Management)

Previous edits are obsolete.

This report is to be completed by grantees, developers, sponsors, builders, agencies, and/or project owners for reporting contract and subcontract activities of \$10,000 or more under the following programs: Community Development Block Grants (entitlement and small cities); Urban Development Action Grants; Housing Development Grants; Multifamily Insured and Noninsured; Public and Indian Housing Authorities; and contracts entered into by recipients of CDBG rehabilitation assistance.

Contracts/subcontracts of less than \$10,000 need be reported only if such contracts represent a significant portion of your total contracting activity. Include only contracts executed during this reporting period.

This form has been modified to capture Section 3 contract data in columns 7g and 7i. Section 3 requires that the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs shall, to the greatest extent feasible, be directed toward low- and very low-income persons, particularly those who are recipients of government assistance for housing. Recipients using this form to report Section 3 contract data must also use Part I of form HUD-60002 to report employment and training opportunities data. Form HUD-2516 is to be

completed for public and Indian housing and most community development programs. Form HUD-60002 is to be completed by all other HUD programs including State administered community development programs covered under Section 3.

A Section 3 contractor/subcontractor is a business concern that provides economic opportunities to low- and very low-income residents of the metropolitan area (or nonmetropolitan county), including a business concern that is 51 percent or more owned by low- or very low-income residents; employs a substantial number of low- or very low-income residents; or provides subcontracting or business development opportunities to businesses owned by low- or very low-income residents. Low- and very low-income residents include participants in YouthBuild programs established under Subtitle D of Title IV of the Cranston-Gonzalez National Affordable Housing Act.

The terms "low-income persons" and "very low-income persons" have the same meanings given the terms in section 3(b)(2) of the United States Housing Act of 1937. Low-income persons mean families (including single persons) whose incomes do not exceed 80 per centum of the median income for the area, as determined by the Secretary, with adjustments for smaller and larger families, except that the Secretary

may establish income ceiling area on the basis of the because of prevailing level families. Very low-income persons) whose incomes do for the area, as determined families, except that the Sec 50 per centum of the median such variations are necessa

Submit two (2) copies of this the end of the reporting per Complete item 7h, only one report.

Enter the prime contractor's only contracts executed du contracts/subcontracts.

Community Development Programs

1. **Grantee:** Enter the name of the unit of government submitting this report.
3. **Contact Person:** Enter name and phone of person responsible for maintaining and submitting contract/subcontract data.

7a. **Grant Number:** Enter the HUD Community Development Block Grant Identification Number (with dashes). For example: B-32-MC-25-0034. For Entitlement Programs and Small City multi-year comprehensive programs, enter the latest approved grant number.

7b. **Amount of Contract/Subcontract:** Enter the dollar amount rounded to the nearest dollar. If subcontractor ID number is provided in 7f, the dollar figure would be for the subcontract only and not for the prime contract.

7c. **Type of Trade:** Enter the numeric codes which best indicates the contractor's/subcontractor's service. If subcontractor ID number is provided in 7f, the type of trade code would be for the subcontractor only and not for the prime contractor. The "other" category includes supply, professional services and all other activities except construction and education/training activities.

7d. **Business Racial/Ethnic/Gender Code:** Enter the numeric code which indicates the racial/ethnic /gender character of the owner(s) and controller(s) of 51% of the business. When 51% or more is not owned and controlled by any single racial/ethnic/gender category, enter the code which seems most appropriate. If the subcontractor ID number is provided, the code would apply to the subcontractor and not to the prime contractor.

7e. **Woman Owned Business:** Enter Yes or No.

7f. **Contractor Identification (ID) Number:** Enter the Employer (IRS) Number of the Prime Contractor as the unique identifier for prime recipient of HUD funds. Note that the Employer (IRS) Number must be provided for each contract/subcontract awarded.

7g. **Section 3 Contractor:** Enter Yes or No.

7h. **Subcontractor Identification (ID) Number:** Enter the Employer (IRS) Number of the subcontractor as the unique identifier for each subcontract awarded from HUD funds. When the subcontractor ID Number is provided, the respective Prime Contractor ID Number must also be provided.

7i. **Section 3 Contractor:** Enter Yes or No.

7j. **Contractor/Subcontractor Name and Address:** Enter this information for each Previous editions are obsolete.

firm receiving contract/subcontract activity only one time on each report for each firm.

Multifamily Housing Programs

1. **Grantee/Project Owner:** Enter the name of the unit of government, agency or mortgagor entity submitting this report.

3. **Contact Person:** Same as item 3 under CPD Programs.

4. **Reporting Period:** Check only one period.

5. **Program Code:** Enter the appropriate program code.

7a. **Grant/Project Number:** Enter the HUD Project Number or Housing Development Grant or number assigned.

7b. **Amount of Contract/Subcontract:** Same as item 7b. under CPD Programs.

7c. **Type of Trade:** Same as item 7c. under CPD Programs.

7d. **Business Racial/Ethnic/Gender Code:** Same as item 7d. under CPD Programs.

7e. **Woman Owned Business:** Enter Yes or No.

7f. **Contractor Identification (ID) Number:** Same as item 7f. under CPD Programs.

7g. **Section 3 Contractor:** Enter Yes or No.

7h. **Subcontractor Identification (ID) Number:** Same as item 7h. under CPD Programs.

7i. **Section 3 Contractor:** Enter Yes or No.

7j. **Contractor/Subcontractor Name and Address:** Same as item 7j. under CPD Programs.

Public Housing and Indian PHAs/HAs are to report all during this reporting period.

1. **Project Owner:** Enter entity submitting this re

3. **Contact Person:** San

4. **Reporting Period:** Cl

5. **Program Code:** Ente

7a. **Grant/Project Numbe** ment Grant or number

7b. **Amount of Contract/**

7c. **Type of Trade:** Same

7d. **Business Racial/Eth** grams.

7e. **Woman Owned Busi**

7f. **Contractor Identificat**

7g. **Section 3 Contractor**

7h. **Subcontractor Identi** Programs.

7i. **Section 3 Contractor**

7j. **Contractor/Subcontra** Programs.

QUARTERLY

Failure to submit this form will result in non-compliance

M/WBE Quarterly Report
of

Is this a final report? Check one.
Yes _____ No _____

NYS AGENCY/AGENCIES Contract No. _____ Project No. _____

The following information indicates the payment amounts made by the grantee/contractor to the NYS Certified M/WBE subcontractor on this project. The payments as shown are in compliance with contract documents for the above reference project.

Contractor's Name and Address		Federal ID#		Goals/Dollar Amount		Contract Type:				
				MBE	% = \$	Paid to Contractor this Quarter:				
				WBE	% = \$	Total Paid to Contractor to Date:				
		Project Completion Date		Work Location		Reporting Period:				
						<input type="checkbox"/> 1 st Quarter (4/1-6/30)	<input type="checkbox"/> 3 rd Quarter (10/1-12/31)	<input type="checkbox"/> 2 nd Quarter (7/1-9/30)	<input type="checkbox"/> 4 th Quarter (1/1-3/31)	
M/WBE Subcontractor/Vendor	Product Code*	Work Status this Report	Total Subcontractor Contract Amount		Payments this Quarter		Previous Payments		Total Payments Made to Date	
			MBE	WBE	MBE	WBE	MBE	WBE	MBE	WBE
Name: Fed ID#:		<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Complete								
Name: Fed ID#:		<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Complete								
Name: Fed ID#:		<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Complete								
Name: Fed ID#:		<input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Complete								
		Total:								

*See Next Page for Product Codes

Date: _____ Name: _____ Title: _____ Signature: _____

Use the following codes in the Product Code column to indicate the category of work for which the M/WBE was utilized:

PRODUCT CODE KEY:

A	Agriculture/Landscaping (e.g., all forms of landscaping services)
B	Mining (e.g., Geological Investigation)
C	Construction
C15	Building Construction - General Contractors
C16	Heavy Construction (e.g., highway, pipe laying)
C17	Special Trade Contractors (e.g., plumbing, heating, electrical, carpentry)
D	Manufacturing (production of goods)
E	Transportation, Communication and Sanitary Services (e.g., Delivery services, warehousing, broadcasting and cable systems)
F/G	Wholesale/Retail Goods (e.g., gravel, hospital supplies and equipment, food stores, computer stores, office supplies)
GS2	Construction Materials (e.g., lumber, paint, lawn supplies)
H	Financial, Insurance and Real Estate Services
I	Services
I73	Business Services (e.g., copying, advertising, secretarial, janitorial, rental services of equipment, computer programming, security services)
I81	Legal Services
I82	Educational Services (e.g., AIDS education, automobile safety, tutoring, public speaking)
I83	Social Services (e.g., counselors, vocational training, child care)
I87	Engineering, architectural, accounting, research, management and related services

[Navigation menu](#)

Prevailing Wage

[Home](#) > [Prevailing Wage](#)

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PRC#: 2024013624

Acceptance Status: Accepted Article 8

Type of Contracting Agency: City

Contracting Agency

Send Reply To

City of Long Beach
Christine Murphy
Administrative Assistant
One West Chester
Long Beach NY 11156

(516) 431-1011
cmurphy@longbeachny.gov

Project Information

Project Title Locker Room and Dispatch

Description of Work Long Beach Police Department Locker Room and Dispatch Center

Contract Id No. NA

Project Locations(s) Long Beach Police Department

Route No / Street Address One West Chester Street

Village / City Long Beach

Town

State / Zip NY 11561

Nature of Project Other Reconstruction, Maintenance, Repair or Alteration

Approximate Bid Date 11/21/2024

Checked Occupation(s) Construction (Building, Heavy & Highway, Sewer, Water, Tunnel)

Applicable Counties
Nassau

[Department of Labor](#)

[Accessibility](#)

[Contact](#)

[Language Access](#)

[Privacy Policy](#)

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.					
	2 Business name/disregarded entity name, if different from above					
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ► _____ <small>Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.</small> <input type="checkbox"/> Other (see instructions) ► _____					
	4 Exemptions (codes apply only to certain entities, not individuals; see Instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <small>(Applies to accounts maintained outside the U.S.)</small>					
	5 Address (number, street, and apt. or suite no.)			Requester's name and address (optional)		
	6 City, state, and ZIP code					
	7 List account number(s) here (optional)					

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I Instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number				
_____	-	_____	-	_____

Employer identification number									
_____	-	_____	-	_____	-	_____	-	_____	_____

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification Instructions. You must cross out Item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, Item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the Instructions on page 3.

Sign Here	Signature of U.S. person ►	Date ►
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)

- Form 1099-C (canceled debt)

- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What Is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What Is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China Income Tax Treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China Treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester;
2. You do not certify your TIN when required (see the Part II Instructions on page 3 for details);

3. The IRS tells the requester that you furnished an incorrect TIN;

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only); or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; do not leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(ii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its Instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(l), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 681

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed..

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS Individual Taxpayer Identification Number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see How to get a TIN below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees; see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. **Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.

2. **Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. **Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.

4. **Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. **Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ³
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ⁴
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ⁵
5. Sole proprietorship or disregarded entity owned by an individual	The actual owner ⁶
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i) (A))	The owner ⁷
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁸
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i) (B))	The trust

³ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

⁴ Circle the minor's name and furnish the minor's SSN.

⁵ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁶ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

⁷ Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-368-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3408, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

LICENSE NO: _____

LICENSE FEE: \$400.00 _____

DATE PAID: _____

RECEIPT NO: _____

GENERAL CONTRACTOR



City of Long Beach
Office of the City Clerk
1 West Chester Street, Long Beach, NY 11561 • (516) 431-1002



APPLICATION FOR MERCANTILE LICENSE - GENERAL CONTRACTOR

CHECK ONE: NEW APPLICATION RENEWAL

CHECK ALL CATEGORIES THAT MAY APPLY:

- Home Improvements (Must include copy of Nassau County Consumer Affairs License)
- Roofing (Insurance forms must specify that roofing is covered; Residential requires Nassau County Consumer Affairs License)
- House Lifting
- Modular Homes/Structures
- New Construction
- Paving
- Other: _____

STATE OF NEW YORK)

COUNTY OF NASSAU) SS

I SOLEMNLY SWEAR TO THE TRUTH OF THE FOLLOWING STATEMENTS:

Trade Name: _____

Corporate Name: _____

Business Address: _____

Telephone No: _____ Fax No: _____

E-mail: _____

Type Of Business: _____

Please list owner(s) name / corporate officers below:

NAME	ADDRESS (Street, City, State, Zip)	DATE OF BIRTH	TITLE	TEL #
------	------------------------------------	---------------	-------	-------

Have any of the above been convicted of a crime? _____ If yes, explain: _____

Are there any facts which differ from the information given last year? _____ If so, state: _____

THIS IS A 2-SIDED FORM. PLEASE COMPLETE BOTH SIDES.

In consideration of being granted the license applied for, I hereby agree to comply with all the rules and regulations of the Police Department, the laws of the City of Long Beach, State of New York, and other proper authorities. I also understand that any violation of said rules and regulations or laws may result in the suspension or revocation of license.

SWORN TO BEFORE ME THIS _____ DAY

TRADE NAME _____

OF _____, 20_____

PRINT NAME and TITLE _____

NOTARY PUBLIC

SIGNATURE _____

REFERENCES (New Applicants Only): Please list three business references:

NAME

ADDRESS

TYPE OF BUSINESS

TEL #

Vehicle Stickers must be displayed on ALL vehicles used in conducting your business in the City of Long Beach.

The first two stickers are included in your fee; each additional sticker is \$12.00.

Please attach a copy of a valid registration for each vehicle

Please list information for each vehicle:

BE SURE TO INCLUDE WITH THIS APPLICATION:

- Copy of Certificate of General Liability Insurance in the amount of \$1,000,000. The City of Long Beach is to be listed as the "Certificate Holder".
 - Copy of Certificate of Workers' Compensation Insurance (C-105.2 or U-26.3 form) or a Certificate of Attestation of Exemption (Form CE-200) and Compliance with the Disability Benefits Law.
 - Copy of current Nassau County License issued by the Department of Consumer Affairs. (Not required for commercial only contractors)
 - A list of five (5) recent jobs which should include NAME, ADDRESS, TYPE OF WORK PERFORMED and APPROXIMATE COST (New Applicants Only).
 - A check or money order for \$400.00 made payable to *City of Long Beach*. Cash, Visa or MasterCard accepted in person only. Checks will be held for 7 business days. Cash and Credit Cards are accepted only in person. Applications received after April 30th will be subject to a \$25.00 late fee.

Contractor Exempt Purchase Certificate

New York State and Local Sales and Use Tax
*To be used only by contractors who are
 registered as New York State sales tax vendors*

To vendors:
 You must collect tax on a sale of taxable property or services unless the contractor gives you a properly completed exemption certificate not later than 90 days after the property is sold or service is rendered. In addition, you must keep the certificate for at least three years, as explained in the instructions.

To contractors and vendors:
 Read the instructions on the back carefully before completing or accepting this certificate.

This certificate is not valid unless all entries are completed and the appropriate box is checked.

Name of vendor	Name of purchasing contractor		
Street address	Street address		
City	State	ZIP code	City
			State
			ZIP code

1 I have been issued a New York State Certificate of Authority, _____, to collect
(enter your sales tax vendor identification number)
 New York State and local sales and use tax, and this certificate has not expired or been suspended or revoked.

2 The tangible personal property or service being purchased will be used on the following project:

_____ located at
(description of project)

_____ pursuant to prime contract dated _____
(address of project)

for and with _____
(name and address of owner)

3 These purchases are exempt from sales and use tax because:
(Check appropriate box; for further explanation, see items a through g on back.)

- a. The tangible personal property is for incorporation into the above project for an organization exempt under section 1116(a) of the Tax Law (*New York State governmental entities, United States governmental entities, United Nations and certain International organizations of which the United States is a member, and certain nonprofit organizations and Indian nations and tribes that have received New York State exempt organization status*).
- b. The tangible personal property is production machinery and equipment, and will be incorporated into real property.
- c. The tangible personal property, including any production machinery and equipment, is for installation within the above project and will remain tangible personal property after installation.
- d. The tangible personal property, including foundation materials, will become an integral component part of a silo used in farming for sale.
- e. The tangible personal property is posts and wire that will be used to make or maintain trellises used directly and predominantly in the production of grapes for sale.
- f. The tangible personal property qualifies as alternative fuel vehicle refueling property.
- g. The services are for the above project and will be resold.
- h. The trash removal service being performed for the above project is in connection with a capital improvement to the real property of an organization exempt under section 1116(a) of the Tax Law.
- i. The services are to install qualifying alternative fuel vehicle refueling property.

Caution: Contractors may not use this certificate to purchase services that are not resold to customers in connection with a project. Construction equipment, tools, and supplies purchased or rented for use in completing a project that do not become part of the finished project may not be acquired tax free through the use of this certificate.

I certify that the above statements are true and complete.

Type or print name and title of owner, partner, etc. of purchasing contractor	
Signature of owner, partner, etc.	Date prepared

Substantial penalties will result from misuse of this certificate.

Instructions

Only a contractor who has a valid *Certificate of Authority* issued by the Tax Department may use this form. The contractor must present it to the vendor to purchase tangible personal property, or to a subcontractor to purchase services tax exempt. This certificate is not valid until all entries have been completed.

The contractor may use this certificate to claim an exemption from sales or use tax on tangible personal property or services that will be used in the manner specified in items a through l below. The contractor may not use this certificate to purchase tangible personal property or services tax exempt on the basis that Form ST-124, *Certificate of Capital Improvement*, has been furnished by the project owner. A separate Form ST-120.1, *Contractor Exempt Purchase Certificate*, must be used for each project.

Tangible personal property for which an exemption is claimed must be physically incorporated into the project identified on the front of this certificate.

Purchase orders showing an exemption from the sales or use tax based on this certificate must contain the address of the project where the property will be used, as well as the name and address of the project owners (see front of this form). Invoices and sales or delivery slips must also contain this information (name and address of the project for which the exempt purchases will be used or where the exempt services will be rendered, as shown on front of this form).

Use of the certificate

This certificate may be used by a contractor only to claim exemption from tax on purchases of tangible personal property that is:

- a. Incorporated into real property under the terms of a contract entered into with an organization that has furnished the contractor with a copy of Form ST-119.1, *Exempt Organization Certification*, governmental purchase order, or voucher.
- b. Incorporated into real property and is production machinery or equipment for which the customer has given the contractor Form ST-121, *Exempt Use Certificate*.
- c. Installed or placed in the project in such a way as to remain tangible personal property after installation. State and local sales tax must be collected from the contractor's customer on both the sale of tangible personal property and the charges for installation, unless the contractor is installing production machinery or equipment and is given the exemption Form ST-121, *Exempt Use Certificate*. In that instance, the contractor is not required to collect any state or local tax on the tangible personal property, but must collect the local tax that applies to the charges for installation.
- d. Used in erecting, adding to, altering, or improving a silo, including the silo's foundation, used to make and store silage on a farm, provided the tangible personal property is to become an integral part of the silo.
- e. Posts and wire for use in constructing or maintaining trellises used directly and predominantly in growing grapes for sale.
- f. Alternative fuel vehicle refueling property used predominantly for: (1) the storage or dispensing of alcohol, natural gas, propane, or hydrogen into the fuel tank of an alternative fuel vehicle, but only if the storage or dispensing of the fuel is at the point where such fuel is delivered into the fuel tank of such a vehicle; or (2) the recharging of an electric vehicle, but only if the property is located at the point where such vehicle is recharged. The property must be subject to an allowance for depreciation and its original use must begin with the purchaser.

This certificate may also be used by a contractor only to claim exemption from tax on services that are:

- g. To install tangible personal property that does not become a part of the real property upon installation; or to repair real property, when the services are for the project named on the front of this form and will be resold; or both.
- Purchases of services for resale can occur between prime contractors and subcontractors or between two subcontractors. The retail seller of the services, generally the prime contractor, must charge and collect tax on the contract price, unless the project owners give the retail seller of the service a properly completed exemption certificate.

- h. Trash removal services purchased by a contractor and rendered in connection with a capital improvement to an exempt organization's property.
- i. To install qualified alternative fuel vehicle refueling property (described in f. above).

To the purchaser

Warning for misuse of this form

Any person who intentionally issues a false exemption certificate to evade sales and compensating use tax may be assessed for the tax evaded, and will be subject to a penalty of 100% of the tax due and a penalty of \$50 for each such certificate issued. The purchaser will also be guilty of a misdemeanor punishable by a fine not to exceed \$10,000 (\$20,000 for a corporation). Other penalties may also apply.

In addition, your *Certificate of Authority*, allowing you to make certain tax-free purchases, may be revoked, prohibiting you from conducting any business in New York State for which a *Certificate of Authority* is required.

To the vendor

Do not accept this certificate unless all entries have been completed. The contractor must give you a properly completed exemption certificate no later than 90 days after delivery of the property or service; otherwise, the sale will be deemed to have been taxable at the time the transaction took place. When a certificate is received after the 90 days, both the seller (vendor) and contractor assume the burden of proving that the sale was exempt, and may have to provide additional substantiation.

Your failure to collect sales tax, as a result of accepting an improperly completed exemption certificate or receiving the certificate more than 90 days after the sale, will make you personally liable for the tax plus any penalty and interest charges due.

You must keep this exemption certificate for at least three years after the due date of the last return to which it relates, or after the date when the return was filed, if later. You must also maintain a method of associating an exempt sale made to a particular customer with the exemption certificate you have on file for that customer.

Caution: You will be subject to additional penalties if you sell tangible personal property or services subject to tax, or purchase or sell tangible personal property for resale, without possessing a valid *Certificate of Authority*. In addition to the criminal penalties imposed under the New York State Tax Law, you will be subject to a penalty of up to \$500 for the first day on which the sale or purchase is made, plus an amount up to \$200 for each subsequent day on which the sale or purchase is made, up to the maximum allowed.

Need Help?

Telephone Assistance is available from 8:30 a.m. to 4:25 p.m., Monday through Friday. For business tax information and forms, call the Business Tax Information Center at 1 800 972-1233. For general information, call toll free 1 800 225-5829. To order forms and publications, call toll free 1 800 462-6100. From areas outside the U.S. and Canada, call (518) 485-8800.

Fax-on-Demand Forms Ordering System - Most forms are available by fax 24 hours a day, 7 days a week. Call toll free from the U.S. and Canada 1 800 748-3876. You must use a Touch Tone phone to order by fax. A fax code is used to identify each form.

Internet Access - <http://www.tax.state.ny.us>
Access our website for forms, publications, and information.

Hotline for the Hearing and Speech Impaired - If you have access to a telecommunications device for the deaf (TDD), you can get answers to your New York State tax questions by calling toll free from the U.S. and Canada 1 800 634-2110. Assistance is available from 8:30 a.m. to 4:15 p.m., Monday through Friday. If you do not own a TDD, check with independent living centers or community action programs to find out where machines are available for public use.

Persons with Disabilities - In compliance with the Americans with Disabilities Act, we will ensure that our lobbies, offices, meeting rooms, and other facilities are accessible to persons with disabilities. If you have questions about special accommodations for persons with disabilities, please call the information numbers listed above.

Mailing Address - If you need to write, address your letter to: NYS Tax Department, Taxpayer Assistance Bureau, W A Harriman Campus, Albany NY 12227.

CITY OF LONG BEACH

BUILDING A BETTER LONG BEACH



POLICE DEPARTMENT DISPATCH COMMUNICATION CENTER INCLUDING LOCKER ROOM UPGRADE

City Council

Brendan Finn, President

Chris Fiumara, Vice President

Roy Lester

John D. Bendo

Michael Reinhart

City Manager

Daniel Creighton

Interim Commissioner of Public Works

Russell Darress