



William Paterson University

ADDITIONS & RENOVATIONS @
WILLIAM PATERSON FIELDHOUSE

WILLIAM PATERSON UNIVERSITY
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Wayne, NJ 07470

ARCHITECT
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SA PROJECT NO. 22.039

MAY 2023

PROJECT MANUAL

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APPENDICES

REQUEST FOR PROPOSAL PUBLIC NOTICE LETTER

PROJECT: RFP - Athletic Fieldhouse Renovation & Addition Project (WP-22-01-27)

Notice is hereby given that responses to this Request For Proposal (RFP) will be received by The William Paterson University of New Jersey, Office of the Associate Vice President for Administration, 358 Hamburg Turnpike, Wayne, New Jersey 07470 for the above named project to be completed and in accordance with the issued request. The RFP can be accessed at <https://www.wpunj.edu/capital-planning/rfp.html>.

A mandatory pre-proposal Walkthrough will be given on **Monday, June 12, 2023 at 10:00am**. Interested parties are required to meet by the entrance of Fieldhouse Athletic Locker Facility (Building #27) on the Campus Map. Parking is available at Parking Lot #2 or Pioneer Parking Garage (Building # 21) which are accessible from Pompton Road via Entry 1. Directions to the Campus can be found at the University's website: www.wpunj.edu (see Directions & Map).

NOTE: If the forecast for this area is inclement weather, call the University (973.720.2475) and/or visit the University's website (www.wpunj.edu) for up-to-date business open/close information.

All questions are to be submitted by **Wednesday, June 21, 2023, and sent via E-mail ONLY** to capitalplanning@wpunj.edu with a subject heading of **WP-22-01-27 RFP - Athletic Fieldhouse Renovation & Addition Project**. All responses to questions, Addendum, Clarification & Updates, if any, will be posted on The University Capital Planning webpage: <https://www.wpunj.edu/capital-planning/rfp.html>. Bidders are responsible to check the Capital Planning webpage periodically for the updates.

All RFP submissions are to be received no later than 12:00 p.m. on Monday, July 10, 2023, at the Office of Mr. Kevin Garvey, Associate Vice President for Administration, William Paterson University of New Jersey, 358 Hamburg Turnpike, College Hall Room 110, Wayne, New Jersey 07470 (Building #35 on the Campus Map). Hardcopy submissions should be unbound, with an electronic copy provided on a USB flash drive, in a sealed envelope: WP-22-01-27 Athletic Fieldhouse Renovation & Addition Project clearly labeled on the outside of the envelope.

All submittals must be submitted as per the format outlined in the University's RFP and as noted herein.

Bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq.

In accordance with N.J.S.A. 18A:64-70, the University will award a contract as a result of this request for proposal to the responsible bidder whose bid, conforming to the invitation to bid is most advantageous to the University, price and all other factors considered.

**Kevin Garvey
Contracting Officer's Representative
Associate VP for Administration
William Paterson University of NJ**



WILLIAM
PATERSON
UNIVERSITY

OFFICE OF THE ASSOCIATE VICE PRESIDENT FOR ADMINISTRATION
COLLEGE HALL 331 • P.O. BOX 913 • WAYNE, NEW JERSEY 07474-0913
973.720.2277 FAX 973.720.2059 • WWW.WPUNJ.EDU

May 30, 2023

Legal Ad Department
Star-Ledger – Advertiser Acct. #XWILL2101305
Woodbridge Corporate Plaza
Iselin, NJ 08630

&

Legal Ad Department
The Record – Advertiser Acct. #507343
150 River Road
Hackensack, NJ 07601

Re: PUBLIC BID
RFP – Athletic Fieldhouse Renovation & Addition Project
(WP-22-01-27)

To Whom It May Concern:

On behalf of The William Paterson University, we are requesting that you place the attached legal notice in your newspaper on **June 1, 2 & 3, 2023 (3 consecutive calendar days)**.

All Copy is to be set single column measure, without display of Agate type (5 2-point) of not less than 10-ems wide, if not otherwise specified. The following exceptions are to be made: top lines are to be set in an 8-point bold face cap.

The laws of the State of New Jersey (R.S.S. 35:2-3) require that every official advertisement contain a statement of the price of the advertisement. In determining this cost you should note that payment will be based on counted lines rather than measure. Invoicing to the University must be presented on the standard "Voucher Payment Form" which must specify the number of lines charged and the rate per line, and also must note the Project Title: **RFP – WPU Fieldhouse Renovation & Addition Project** and Number(s): **(WP-22-01-27)**.

Proof of publication, with bill for same, should be submitted to William Paterson University of New Jersey, Accounts Payable, 358 Hamburg Turnpike, Wayne, New Jersey 07470, upon completion of the publication.

Please note the cost of said service is exempt from New Jersey Sales Tax. The University's Exempt Certificate Number is 22-75-005.

Very truly yours,

Kevin Garvey
Associate Vice President for Administration

/my
Enclosure
rv. 9.16.19

INSTRUCTIONS TO BIDDERS**ARTICLE IB****IB 1 Bid Proposals**

IB 1.1 Sealed proposals for the work described herein must be received and time-stamped at the University prior to the closing date and time for proposals as stated in the Advertisement and/or Notice to Bidders. Bidders are cautioned that reliance on the U.S. Postal Service or other delivery services for timely delivery of proposals is at the bidder's risk. Failure by the Contractor to have sealed proposals reach the University by the prescribed time will result in a return of the submission unopened and unread.

IB 1.2 Bids are required to be submitted for a single Contract for all the Work with all trade disciplines included.

IB 1.3 The Instructions to Bidders, Bid Form, Contract Forms, Drawings and Specifications, and other Contract Documents are available for download at no cost at the William Paterson University Capital Planning Website <http://www.wpunj.edu/capital-planning/rfp.html>. Notice of revisions or addenda to advertisements or bid documents shall be emailed, return receipt requested, to potential bidders that attended the mandatory site meeting no later than seven days, Saturdays, Sundays and holidays excepted, prior to the bid due date.

IB 1.4 Bid proposals based upon the Instructions to Bidders, Drawings, Specifications, General and Supplemental Conditions, Addenda and other Contract Documents shall be deemed as having been made by the Contractor with full knowledge of the conditions included therein. Bidders are required to visit the site prior to submitting proposals for the work herein described, and to have thoroughly examined the conditions under which the Contract is to be executed including those reasonably observable conditions of the premises which could hinder, delay, or otherwise affect the performance of the Work required under the terms of the Contract. Only firms attending the mandatory site visit and signing the sign-in sheet are eligible to bid on the project. The University will not allow claims for additional costs as a result of the Contractor's failure to become aware of the reasonably observable conditions affecting their required performance. The Bidder is required to make appropriate allowances in the preparation of their bid for the accommodation of such conditions. The Bidder must warrant that they are familiar with conditions existing at the site at the time the bid is submitted.

IB 1.4.1 The University assumes no responsibility for the accuracy of data furnished, which relates to existing conditions. If any bidder deems it advisable, the bidder shall, at

their own expense, conduct exploration to the degree they believe necessary to assure themselves of the conditions actually prevailing.

IB 1.4.2 Submission of a proposal will be construed as evidence that the bidder has familiarized himself/herself with existing conditions and has obtained whatever additional data is believed to be necessary. Claims based on difficulties encountered, which could have been anticipated through such actions, will not be recognized.

IB 1.5 Proposals shall be submitted using the Bid Form provided by the University, enclosed in a sealed envelope. The name and address of the Bidder must be indicated on the envelope, as well as the University project number, project location and other appropriate identification. In the event of a Bidder submitting multiple proposals, the Bidder must provide a separate Proposal form for each specific proposal, each in its own envelope.

IB 1.6 All amounts in the proposals shall be stated in numerical figures only.

IB 1.7 The bidder must include in the bid envelope the entire completed Proposal Form, including the affidavit of non-collusion and bid security, and all other items delineated in the Supplemental Instructions for Bidding and Completing Proposal Forms. Where indicated, Proposal Form pages shall be notarized, signed and with corporate seal.

IB 1.8 Proposals shall remain open for acceptance and may not be withdrawn for a period of sixty (60) days after bid opening date. Bids may also remain open for acceptance for more than 60 days with the consent of the bidder.

IB 1.9 On the Bid Form, the proposal shall set forth the names and license numbers of subcontractors to whom the Bidder will subcontract the work where requested.

IB 2 Bid Modification

IB 2.1 A bidder may modify its bid by withdrawing the submitted bid and resubmitting a revised bid at any time prior to the scheduled closing time for receipt of bids. A written confirmation by letter or email submitted by the bidder, withdrawing and resubmitting its bid, must be mailed or emailed and received by the University prior to the specified closing time. Modified bids shall be accompanied by a newly executed affidavit of non-collusion.

IB 2.2 Email and other communications shall not relieve the bidder of the requirement to submit a formal hard copy of the sealed bid as required.

IB 2.3 Bids may be withdrawn upon written request received from bidders prior to the time fixed for the bid opening. Right of withdrawal of a bid is lost after bids have been opened. If any error has been made in the bid amount, request for the relief from the bid may be made in writing to the Contracting Officer within 48 hours of the bid opening. The written request shall be signed by an authorized corporate officer. A determination of whether the Bidder will be released will be at the sole discretion of the Contracting Officer, who shall issue their finding within five (5) days of their receipt of all pertinent information relating to such request for relief.

IB 3 Qualification of Bidders

IB 3.1 The University may conduct any investigation it deems necessary to determine the Bidder's responsibility and capacity and the bidder shall furnish all information and data for this purpose as the University may request.

IB 3.2 Bidders are required to possess the appropriate DPMC classification and financial capacity and bonding requirements, consistent with the Prequalification Statute (N.J.S.A.52:35-1 et seq.) in order to have their bids considered. An appropriate Notice of DPMC Classification is required to be submitted with the bid.

IB 3.3 Named subcontractors on the Bid Form are also required to be DPMC classified in their respective trades at the time of bid.

IB 3.4 The Public Works Contractor Registration Act (N.J.S.A. 34:11-56.48, et seq.) requires all contractors and subcontractors listed on a bid proposal to be registered, with the Department of Labor and Workforce Development at the time the bid is made. A contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall not engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.

IB 4 Consideration of Bids

IB 4.1 Award of contracts or rejection of bids:

- a. A contract will be awarded to the lowest responsible bidder whose bid is deemed the most advantageous to the University. The Award(s) will be made, or the bids rejected, within sixty (60) days from the date from the opening of the bids, except as provided in IB 1.8.

- b. The bid security deposits of the successful bidder and the next two (2) lowest bidders will be retained by The University until the execution and delivery of a formal Contract and Performance and Payment Bonds by the low bidder. At such time, the bid deposits of the other two (2) low bidders will be returned.
- c. The Contracting Officer reserves the right to award the contract or contracts based on any one of the following options, as they deem most advantageous to the University:
 - 1. Single Bid for the entire work.
 - 2. Separate Bids for the General Construction, Structural Steel, Plumbing and Fire Protection, HVAC, and Electrical Work.
 - 3. Combination of Single Bid and Accepted Alternate Bids.
 - 4. Combination of Separate Bids and Accepted Alternate Bids.
- d. Alternate Bids will be accepted or rejected in numerical sequence as cited in the Bid Documents and will not be selected at random. Add alternate bids and Deduct alternate bids shall be separated. The University may choose from the add and deduct alternates without priority between the two groups so long as selection within each group is in numerical sequence. This limitation shall not apply, however, to any alternate bids concerning proprietary items.
- e. Should submission of unit prices be required for specified items of work in proposals, they may, at the discretion of the Contracting Officer, be considered in the evaluation of bids. Unit prices provided by the contractor on the bid form are inclusive of all associated costs including labor, materials, bonds, insurance, overhead and profit.
- f. The Contracting Officer reserves the right to waive in their sole discretion any bid requirements when such waiver is in the best interests of The University and where such waiver is permitted by law.
- g. The Contracting Officer reserves the right to reject any and all bids, in accordance with applicable law, when such rejection is in the best interests of The University. The Contracting Officer also may reject

the bid of any bidder who, in their judgment, is not responsible or capable of performing the contract based on financial capability, past performance, or experience. A bidder whose bid is so rejected may request a hearing before the Contracting Officer by filing a written notice within seven (7) days of the transmittal of the rejection.

IB 4.2 The Bidder to whom a contract is awarded shall execute and deliver the requisite documents including Payment and Performance Bonds within the time specified. Upon their failure or refusal to comply in the manner and within the time specified, the Contracting Officer may either award the contract to the next low responsible bidder or re-advertise for new proposals. In either case, the Contracting Officer may hold the defaulting bidder and their surety liable for the difference between the applicable sums quoted by the defaulting bidder and that sum which the University may be obligated to pay to the contractor who undertakes to perform and complete the work of the defaulting bidder.

IB 4.3 It is William Paterson University's policy to meet the State Small Business Enterprise ("SBE") goal, referenced in N.J.A.C. 17:14-1.1 et seq., of 25% to be awarded to small businesses registered in the category of businesses whose gross revenues do not exceed the applicable annual revenue standards. This SBE goal applies to this contract. The bidding package includes a small business utilization form or forms considered a material and mandatory requirement which must be completed and included as part of the bidder's proposal. Failure to complete and submit the form or forms shall be sufficient basis to deem the proposal non-responsive and thus subject to mandatory rejection. The Affidavit of Outreach form and Schedule of SBE Participation are required to be submitted with the bid. All SBE aspects of this contract, including both William Paterson University's obligations and the Contractor's obligations, shall at all times be consistent with the regulations of N.J.A.C. Title 17 Chapter 14, and the requirements of Executive Orders 71 and 151.

IB 5 Bid Bond/Certified Check

IB 5.1 Each proposal shall be accompanied by a Bid Bond or by a certified check, made payable to the University, equal to ten percent (10%) of the amount of the proposal, as evidence of good faith, which guarantees that if the proposal submitted by the Bidder is accepted, the Bidder will enter into the contract and furnish the required Documents and Surety Bonds in accordance with applicable law. If a Bid Bond is submitted, it shall also provide that the Surety issuing the Bid Bond will be bound to issue the required Payment and Performance Bonds, if the Bidder is awarded the contract. If the Bidder whose proposal is accepted is unable to provide the Performance and Payment Bonds or fails to execute a contract, the Contracting Officer may hold the defaulting bidder and

their surety liable for the difference between the applicable sum quoted by the defaulting Bidder and that sum which the University may be obligated to pay to the contractor who undertakes to perform and complete the work of the defaulting bidder. The University reserves the right to retain any certified check deposited hereunder as reimbursement for the difference as aforesaid, and shall return any not required balance to the Bidder. Should there be a deficiency in excess of the Bid deposit, the Bidder and the Surety shall pay the entire amount of the University's difference in cost upon demand. Nothing contained herein shall be construed as a waiver of any other legal remedies the University may have by reason of a default or breach by the contractor. Certified checks or bonds submitted by unsuccessful bidders will be returned after the contract has been executed as described in IB4.1.b. Contractors electing to furnish a bid bond must include consent of surety, both in form acceptable to the University.

IB 5.2 Attorneys in Fact who sign bid bonds or contract bonds shall file a certified Power of Attorney with the University indicating the effective date of that power.

IB 6 Awards

IB 6.0 Once a decision is reached a Notice of Intent to Award will be posted to the project website. Bidders have 10 business days from posting of the Notice of Intent to Award to protest a bid or intended award in writing, citing the reason. If bidders wish to protest the bid documents that must also be done in writing citing sufficient reason, but prior to the last deadline for questions with respect the bidding process. All correspondence is through capitalplanning@wpunj.edu. It is the bidder's responsibility to check the website periodically for updated information.

IB 6.1 In executing a contract, the successful bidder agrees to perform their work in a good and workmanlike manner to the reasonable satisfaction of the Contracting Officer and to perform all work consistent with the contract schedule milestones and calendar days detailed in the Supplemental General Conditions.

IB 6.2 The successful Bidder will be given a Notice of Award, specifying the time and place of the Award Meeting at which the contract will be signed. Key requirements in the conduct of the contract, including, but not limited to, schedule requirements for the performance of the contract, manner and schedule of payments and other administrative details will be reviewed at the Award Meeting. The time and place of the first Project Progress Meeting also will be announced.

IB 7 Performance and Payment Bond

IB 7.1 The Bidder must submit with their Bid a certificate from a Surety company stating that it will provide the Bidder with the required Performance and Payment Bonds in the specified amount and form.

IB 7.2 The successful Bidder shall furnish within ten (10) calendar days after Notice of Award a Performance Bond in statutory form in an amount equal to one hundred percent (100%) of the total contract Price as security for the faithful performance of this contract and also a Payment Bond in statutory form in amount equal to one hundred percent (100%) of the contract price as security for the payment of all persons and firms performing labor and furnishing materials in connection with this contract. The Performance Bond and the Payment Bond may be in one or in separate instruments in accordance with the law. If in one instrument, the amount of the Payment and Performance Bond shall be two hundred percent (200%) of the contract Price. No contract shall be executed unless and until each Bond is submitted to and approved by the University. The surety must be presently authorized to do business in the State of New Jersey and meet the requirements of P.L. 1995 c.384 and those included herein.

Payment and Performance Bonds will not be accepted, unless there is attached thereto a Surety Disclosure Statement and Certification to which each surety executing the bond shall have subscribed in the form provided.

IB 7.3 The cost of all bonds shall be paid by the contractor.

IB 7.4 If at any time the University, for justifiable cause, is dissatisfied with any surety or sureties who have issued, or propose to issue, the Performance and/or Payment Bond, the contractor shall, within ten (10) days after notice from the University to do so, substitute an acceptable bond (or bonds) in such form and sum and executed by such other surety or sureties as may be satisfactory to the University. No contract shall be executed and/or no payment made under a contract until the new surety or sureties have furnished such an acceptable bond to the University.

IB 7.5 Bonds shall be legally effective as of the date the contract is signed. Bonds shall indicate the contractor's name exactly as it appears on the contract. Current Attorney In Fact instruments and financial statement of the surety must be included with the Bonds. Bonds shall be executed by an authorized officer of the surety. Bonds furnished under this article shall conform in all respects to the requirement and language of N.J.S.A. 2A:44-143 to 147.

IB 7.6 Bonding shall be consistent with N.J.S.A. 18:64-68 as follows:

William Paterson University requires that all performance bonds be issued by a surety which meets the following standards:

(1) The surety shall have the minimum surplus and capital stock or net cash assets required by R.S.17:17-6 or R.S.17:17-7, whichever is appropriate, at the time the invitation to bid is issued; and

(2) With respect to all payment and performance bonds in the amount of \$850,000 or more,

(a) if the amount of the bond is at least \$850,000 but not more than \$3.5 million, the surety shall hold a current certificate of authority, issued by the United States Secretary of the Treasury pursuant to 31 U.S.C.s.9305, that is valid in the State of New Jersey as listed annually in the United States Treasury Circular 570, except that if the surety has been operational for a period in excess of five years, the surety shall be deemed to meet the requirements of this subparagraph if it is rated in one of the three highest categories by an independent, nationally recognized United States rating company that determines the financial stability of insurance companies, which rating company or companies shall be determined pursuant to standards promulgated by the Commissioner of Banking and Insurance by regulation adopted pursuant to the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.), and

(b) if the amount of the bond is more than \$3.5 million, then the surety shall hold a current certificate of authority, issued by the United States Secretary of the Treasury pursuant to 31 U.S.C.s.9305, that is valid in the State of New Jersey as listed annually in the United States Treasury Circular 570 and, if the surety has been operational for a period in excess of five years, shall be rated in one of the three highest categories by an independent, nationally recognized United States rating company that determines the financial stability of insurance companies, which rating company or companies shall be determined pursuant to standards promulgated by the Commissioner of Banking and Insurance by regulation adopted pursuant to the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.). A surety subject to the provisions of subparagraph (b) of this paragraph which does not hold a certificate of authority issued by the United States Secretary of the Treasury shall be exempt from the requirement to hold such a certificate if the surety meets an equivalent set of standards developed by the Commissioner of Banking and Insurance through regulation which is at least equal, may exceed, the general criteria required for issuance of a certificate of authority by the United States Secretary of the Treasury pursuant to 31 U.S.C.s.9305. A surety company seeking such an exemption shall, not later than the 180th day following the effective date of P.L.1995, c.384 (N.J.S.2A:44-143 et al.), certify to the appropriate State college that it meets that equivalent set of standards set forth by the commissioner as promulgated.

The University shall not accept more than one payment and performance bond to cover a single construction contract. The University may accept a single bond executed by more than one surety to cover a single construction contract only if the combined underwriting limitations of all the named sureties, as set forth in the most current annual revision of United States Treasury Circular 570, or as determined by the Commissioner of Banking and Insurance pursuant to R.S.17:18-9, meet or exceed the amount of the contract to be performed.

The University shall not accept a payment or performance bond unless there is attached thereto a Surety Disclosure Statement and Certification to which each surety executing the bond shall have subscribed. This statement and certification shall be complete in all respects and duly acknowledged according to law, and shall have substantially the following form:

SURETY DISCLOSURE STATEMENT AND CERTIFICATION

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

(1) The surety meets the applicable capital and surplus requirements of *R.S.17:17-6* or *R.S.17:17-7* as of the surety's most current annual filing with the New Jersey Department of Banking and Insurance.

(2) The capital (where applicable) and surplus, as determined in accordance with the applicable laws of this State, of the surety(ies) participating in the issuance of the attached bond is (are) in the following amount(s) as of the calendar year ended December 31, (most recent calendar year for which capital and surplus amounts are available), which amounts have been certified as indicated by certified public accountants (indicating separately for each surety that surety's capital and surplus amounts, together with the name and address of the firm of certified public accounts that shall have certified those amounts):

(3) (a) With respect to each surety participating in the issuance of the attached bond that has received from the United States Secretary of the Treasury a certificate of authority pursuant to 31 U.S.C.s. 9305, the underwriting limitation established therein and the date as of which that limitation was effective is as follows (indicating for each such surety that surety's underwriting limitation and the effective date thereof):

(b) With respect to each surety participating in the issuance of the attached bond that has not received such a certificate of authority from the United States Secretary of the Treasury, the underwriting limitation of that surety as established pursuant to *R.S.17:18-9* as of (date on which such limitation was so established) is as follows (indicating for each such surety that surety's underwriting limitation and the date on which that limitation was established):

(4) The amount of the bond to which this statement and certification is attached is \$.

(5) If, by virtue of one or more contracts of reinsurance, the amount of the bond indicated under item (4) above exceeds the total underwriting limitation of all sureties on the bond as set forth in item (3)(a) or (3)(b) above, or both, then for each such contract of reinsurance:

(a) The name and address of each such reinsurer under that contract and the amount of that reinsurer's participation in the contract is as follows:

; and

(b) Each surety that is party to any such contract of reinsurance certifies that each reinsurer listed under item (5)(a) satisfies the credit for the reinsurance requirement established under P.L.1993, c.243 (*C.17:51B-1 et seq.*) and any applicable regulations in effect as of the date on which the bond to which this statement and certification is attached shall have been filed with the appropriate public agency.

CERTIFICATE

(to be completed by an authorized certifying agent
for each surety on the bond)

I (name of agent), as (title of agent) for (name of surety), a corporation/mutual insurance company/other (indicating type of business organization) (circle one) domiciled in (state of domicile), DO HEREBY CERTIFY that, to the best of my knowledge, the foregoing statements made by me are true, and ACKNOWLEDGE that, if any of those statements are false, this bond is VOID.

(Signature of certifying agent)
(Printed name of certifying agent)
(Title of certifying agent)

IB 8 Addenda and Interpretations

IB 8.1 No interpretation of the meaning of the Drawings, Specifications or other bid documents will be provided to any prospective bidder unless such interpretation is made in writing to all prospective bidders as an Addendum prior to bid opening. Receipt of all Addenda must be acknowledged in bid proposals submitted. Failure of a contractor to acknowledge receipt of all such Addenda in their proposal shall result in

their proposal being considered non-responsive, at the option of the Contracting Officer. Any interpretations not in accordance with this provision shall be unauthorized and not binding upon the University.

IB 8.2 Every request for additional information or an interpretation relating to clarification or correction of the Drawings, Specifications or other bid documents shall be made by email to capitalplanning@wpunj.edu and must be received prior to the posted or published time for the last day for questions. Every request must also be submitted in a format where the text can be “cut and pasted” to avoid retyping in the response. Any and all additional information, interpretations, clarifications or corrections and any supplemental instructions will be issued from the University by emailing the form of an addendum no later than three (3) business days prior to the date of the opening of bids. All Addenda issued shall become part of the contract documents and will be posted on the Capital Planning website.

IB 8.3 Each Bidder shall be responsible for thoroughly reviewing the contract Documents prior to submission of bids. Bidders are advised that no claim for expenses incurred or damage sustained on account of any error, discrepancy, omission, or conflict in the contract documents will be recognized by the University unless, and only to the extent that a written request for interpretation, clarification, or correction has been submitted in compliance with IB 8.2, and the matter has not been addressed by the University through the issuance of an addendum interpreting, clarifying and/or correcting such error, discrepancy, omission, or conflict.

IB 9 Assignments

IB 9.1 The contractor shall not assign the whole or any part of this contract without written consent of the University. Money due or to become due the contractor hereunder shall not be assigned for any purposes whatsoever.

IB 10 Taxes

IB 10.1 In general, bidders, in preparing their bids, must take into consideration applicable federal and state tax laws.

IB 10.2 Under Chapter 32 of the Internal Revenue Code, an exemption certificate is on file with the Contracting Officer of the Division of Purchase and Property (Number 22-75-005).

IB 10.3 Materials, supplies, or services for exclusive use in erecting structures or buildings or otherwise improving, altering or repairing all University owned property are exempt from the state sales tax.

IB 10.4 Bidders must make their own determinations as to the current status and applicability of any tax laws and the contractor may make no claim based upon any error or misunderstanding as to the applicability of any tax laws.

IB 10.5 Purchases or rentals of equipment are not exempt from any tax under the State Sales Tax Act.

IB 11 Restrictive Specifications

IB 11.1 Should any bidder determine before the publicly advertised last day for questions that any portion of the Specifications or Drawings specify a particular product which can be provided by only one supplier or manufacturer, with the result that competitive prices are not available, they shall immediately notify the Contracting Officer at capitalplanning.edu of such fact with supporting documentation.

IB 11.2 If such notice is not given prior to the bid due date and time, it shall be assumed that the bidder has included the estimate of such sole source in its bid. In the alternative, if the Contracting Officer is notified in a timely manner, of the requirement in the specification of a sole source of supply or manufacture, they may order the plans/specifications to be revised, the project to be bid again, or take any other lawful action.

IB 11.3 The Supplemental Instructions for Bidding will list items that shall not be substituted with the associated drawings numbers or specification sections.

IB 12 Offer of Gratuities

IB 12.1 N.J.S.A. 52:34-19 makes it a misdemeanor to offer, pay or give any fee, commission, compensation, gift or gratuity to any person employed by the State. It is the policy of the University to treat the offer of any gift or gratuity by any company, its officers, or employees, to any person employed by William Paterson University as grounds for debarment or suspension of such company from bidding on and providing work or materials on University contracts.

IB 13 New Jersey Business Registration Requirements

IB 13.1 In compliance with N.J.S.A 52:32-44, the contractor shall provide the business registration of the contractor and that of any named subcontractor prior to the time a contract, purchase order, or other contracting document is awarded or authorized.

A subcontractor named in a bid or other proposal made by a contractor to the University shall provide a copy of its business registration to any contractor who shall provide it to the University. No contract with a subcontractor shall be entered into by any contractor under any contract with the University unless the subcontractor first provides the contractor with proof of a valid business registration.

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

IB 13.2 A contractor or a contractor with a subcontractor that has entered into a contract with the University, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their taxable sales of tangible personal property delivered into this State.

A contractor with a subcontractor, shall include in its contract with that subcontractor, for the term of the contract, a requirement that the subcontractor and each of their affiliates shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their sales of tangible personal property delivered into this State.

For the purposes of this subsection, "affiliate" means any entity that (1) directly, indirectly, or constructively controls another entity, (2) is directly, indirectly, or constructively controlled by another entity, or (3) is subject to the control of a common entity. For purposes of this subsection an entity controls another entity if it owns, directly or individually, more than 50% of the ownership interest in that entity.

IB13.3 In accordance with NJSA 54:49-4.1, A business organization that fails to provide a copy of a business registration as required pursuant to section 1 of P.L.2001, c.134 (C.52:32-44 et al.) or subsection e. or f. of section 92 of P.L.1977, c.110 (C.5:12-92), or that provides false information of business registration under the requirements of either of those sections, shall be liable for a penalty of \$25 for each day of violation, not to exceed

\$50,000 for each business registration copy not properly provided under a contract with the university.

IB 14 Political Contribution Requirements

Pursuant to N.J.S.A. 19:44A-1 et seq., (P.L. 2005, Chapter 51, as amended by P.L. 2009, c.56) the University may not enter into any contract or other agreement exceeding \$17,500 with business entities or individuals that have made certain political contributions of \$300 or more as set forth in the statute. It is required that all bidders accurately complete a Vendor Certification of Political Contributions Form, which is included with the Proposal Form. The business entity shall have a continuing duty to report any contribution it makes during the term of the contract.

Compliance with this law shall be a material term and condition of the contract and binding upon the parties thereto upon the entry of all applicable contracts.

Additional information may be obtained on the University's website at <http://www.wpunj.edu/purchasing/public-law-2005-chapter-51-and-executive-order-117.dot>.

IB 15 ADDITIONAL "PAY-TO-PLAY" RESTRICTIONS

Executive Order No. 117 (Corzine) is designed to enhance New Jersey's efforts to protect the integrity of government contractual decisions and increase the public's confidence in government. The Executive Order builds on the provisions of P.L. 2005, c. 51 ("Chapter 51"), which limits contributions to certain political candidates and committees by for-profit business entities that are, or seek to become, State government vendors.

Executive Order No. 117 extends the provisions of Chapter 51 in two ways:

1. The definition of "business entity" is revised and expanded so that contributions by the following individuals also are considered contributions attributable to the business entity:
 - Officers of corporations and professional services corporations, with the term "officer" being defined in the same manner as in the regulations of the Election Law Enforcement Commission regarding vendor disclosure requirements (N.J.A.C. 19:25-26.1), with the exception of officers of non-profit entities;

- Partners of general partnerships, limited partnerships, and limited liability partnerships and members of limited liability companies (LLCs), with the term “partner” being defined in the same manner as in the regulations of the Election Law Enforcement Commission regarding vendor disclosure requirements (N.J.A.C. 19:25-26.1); and
- Spouses, civil union partners, and resident children of officers, partners, LLC members and persons owning or controlling 10% or more of a corporation’s stock are included within the new definition, except for contributions by spouses, civil union partners, or resident children to a candidate for whom the contributor is eligible to vote or to a political party committee within whose jurisdiction the contributor resides.

2. Reportable contributions (those over \$300.00 in the aggregate) to legislative leadership committees, municipal political party committees, and candidate committees or election funds for Lieutenant Governor are disqualifying contributions in the same manner as reportable contributions to State and county political party committees and candidate committees or election funds for Governor have been disqualifying contributions under Chapter 51.

Executive Order No. 117 applies only to contributions made on or after November 15, 2008, and to contracts executed on or after November 15, 2008. It is required that all bidders accurately complete a Vendor Certification of Political Contributions Form, which is included with the Proposal Form.

IB16 [Reserved]

IB 17 Form AA-201, Initial Project Workforce Report.

The contractor shall complete and submit an Initial Project Workforce Report Form AA-201 upon notification of award, but prior to signing contract, to the New Jersey Department of Treasury, Division of Contract Compliance and Equal Employment Opportunity in Public Contracts, P.O. Box 209, Trenton, New Jersey 08625-0209. Kindly provide them with two copies; provide the University with one (1) copy; and keep a copy for the contractor’s own records. Proper completion and submission of this report shall constitute evidence of the contractor’s compliance with the regulations. Failure to submit this form may result in the contract being terminated.

The contractor also agrees to submit a copy of the Monthly Project Workforce Report Form AA-202 once a month thereafter for the duration of the contract to the Division and to the public agency compliance officer.

IB 18 N.J.S.A. 52:34-6.4. Requirement of State to purchase “Energy Star” products in public contracts.

Notwithstanding the provisions of any other law to the contrary, and unless the Contracting Officer, shall determine it to be inconsistent with the public interest, or the cost to be unreasonable, the State, with respect to products procured for its own use under any contract paid with or out of State funds, shall acquire only products bearing the federal Environmental Protection Agency’s Energy Star label.

IB 19 State of New Jersey Executive Order #189

a. No vendor shall pay, offer to pay, or agree to pay, either directly or indirectly, any fee, commission, compensation, gift, gratuity, or other thing of value of any kind to any State officer or employee or special State officer or employee, as defined by N.J.S.A. 52:13D-13b. and e., in the Department of the Treasury or any other agency with which such vendor transacts or offers or proposes to transact business, or to any member of the immediate family, as defined by N.J.S.A. 52:13D-13i., of any such officer or employee, or any partnership, firm, or corporation with which they are employed or associated, or in which such officer or employee has an interest within the meaning of N.J.S.A. 52:13D-13g.

b. The solicitation of any fee, commission, compensation, gift, gratuity or other thing of value by any State officer or employee or special State officer or employee from any State vendor shall be reported in writing forthwith by the vendor to the Attorney General and the Executive Commission on Ethical Standards.

c. No vendor may, directly or indirectly, undertake any private business, commercial or entrepreneurial relationship with, whether or not pursuant to employment, contract or other agreement, express or implied, or sell any interest in such vendor to, any State officer or employee or special State officer or employee having any duties or responsibilities in connection with the purchase, acquisition or sale of any property or services by or to any State agency or any instrumentality thereof, or with any person, firm or entity with which they are employed or associated or in which they have an interest within the meaning of N.J.S.A. 52:13D-13g. Any relationships subject to this provision shall be reported in writing forthwith to the Executive Commission on Ethical Standards, which may grant a waiver of this restriction upon application of the State officer or employee or special State officer or employee upon a finding that the present

or proposed relationship does not present the potential, actuality or appearance of a conflict of interest.

d. No vendor shall influence, or attempt to influence or cause to be influenced, any State officer or employee or special State officer or employee in their official capacity in any manner which might tend to impair the objectivity or independence of judgment of said officer or employee.

e. No vendor shall cause or influence, or attempt to cause or influence, any State officer or employee or special State officer or employee to use, or attempt to use, their official position to secure unwarranted privileges or advantages for the vendor or any other person.

f. The provisions cited above in paragraph 3a. through 3e. shall not be construed to prohibit a State officer or employee or special State officer or employee from receiving gifts from or contracting with vendors under the same terms and conditions as are offered or made available to members of the general public subject to any guidelines the Executive Commission on Ethical Standards may promulgate under paragraph 3c.

END OF INSTRUCTIONS TO BIDDERS

*William Paterson University of New Jersey***PROJECT NAME:*****Athletic Fieldhouse Renovation & Addition Project*****PROJECT NUMBER:****WP-22-01-27****SUPPLEMENTAL INSTRUCTIONS FOR BIDDING AND
COMPLETING PROPOSAL FORMS**

- A) All work defined in the contract documents is for the Athletic Fieldhouse Renovation & Addition Project – WP-22-01-27. All work is to be completed as noted in the Time for Completion, Section E of these Supplemental Instructions. Bidders are also to reference the Instructions to Bidders and General Conditions documents, also issued as part of this bid, for further details, requirements, and information.

- B) Prequalification:

Bidders for this project are not required to be New Jersey DPMC classified at the time of bid. Please disregard this requirement in the Instruction to Bidders, Section IB 3.4. Bidders must possess the available bonding capacity consistent with the Prequalification Statute (N.J.S.A.52:35-1 et seq.) to have their bids considered.

All required major subcontractors, if intended to be used, shall be named by each bidder in the appropriate spaces on the Bid Form. Such named intended major subcontractors shall become the actual subcontractors for the work identified, in the event the bidder is successful in being awarded a contract. No substitution of a major subcontractor shall be made unless the contractor receives approval in writing by the Contracting Officer.

Due to the intricacies of the building's interior, a Mandatory Pre-Bid Meeting and Site Inspection is required for this request for proposal. This will insure that all interested bidders have an equitable opportunity to make a thorough and complete examination of the construction site and to understand the site landscape in order to submit a detailed proposal that accurately reflects the scope of work and which provides the University the information to equitably evaluate the proposals.

- C) Bidders shall provide materials as required by the Bid Document Checklist and forms included therein.

- D) Form Requirements:

1. Forms are to be signed by Principal of the firm where signatures are called for.
2. Forms are to be notarized where called for.
3. Forms are to be sealed where called for. (Note – when a corporation, seal locations are in bold)

E) Time for Completion and Sequence of Operations:

The anticipated contract award will be prior to July 31, 2023. Onsite work can commence after July 31, 2023. All work is to be substantially completed not later than June 30, 2024. All remaining work completed by not later than July 31, 2024.

F) Modify General Conditions as follows:

Articles 5.27.4, 5.27.5 and 5.27.7 Not used

Article 5.27.14 Not used

Article 6.1.3 Not used

Article 8.7.1 Modify as follows: Liquidated damages shall be \$1,000.00 per calendar day.

G) Award is contingent upon the selected bidder executing the University's standard contract for construction, which can be accessed at <https://www.wpunj.edu/capital-planning/contracts-and-forms.html>

Award is also contingent upon the contractor entering an agreement with the Passaic County Building and Construction Trades Council, AFL-CIO as part of project's labor agreement (PLA). The PLA and Passaic County Prevailing Wage rates have been included as Reference Documents on the project <http://www.wpunj.edu/capital-planning/rfp.html> webpage.

H) BIDDER'S SUPPLEMENTARY INFORMATION (Upon request of the University only, after initial bid submission)

1. Identify projects of similar scope to this project completed in the last 3 years of at least \$2 Million in contract value. For each identify the following:
 - A) Contracted Completion Date
 - B) Value of Work in Contract
 - C) Relationship with Property Owner (prime, subcontractor, material supplier)
 - D) Owner Contact
 - E) Location of Project
2. List the type of work normally performed with your own forces.

D) ACCEPTANCE OF BID:

This Proposal may be withdrawn at any time prior to the scheduled time for its acceptance. The Bidder agrees that after its acceptance, the Proposal may not be withdrawn for a period of sixty (60) calendar days, except as provided in the Instructions to Bidders IB 2.3.

E) BID SECURITY:

In the event the Contract and required Bonds are not executed by the Bidder within the time set forth, the attached Bid Security in the amount of 10% of the Lump Sum Bid will become the property of the University as liquidated damages for the delay and additional expense to the University caused thereby.

Certified Check \$_____ or Bid Bond \$_____
(10% of bid) (10% of bid)

F) PREQUALIFICATION:

Bidders are required to possess the appropriate DPMC classification and financial capacity and bonding requirements, consistent with the Prequalification Statute (N.J.S.A.52:35-1 et seq.) in order to have their bids considered. An appropriate Notice of DPMC qualification is required to be submitted with the bid (see sample attached).

G) CONTRACT AND BOND

Upon receipt of written notice of the acceptance of this proposal, the Bidder shall execute a formal Contract within 10 calendar days and deliver a Performance Bond and Payment Bond, or a combined Performance-Payment Bond to the University, as called for in the Instructions to Bidders, Section IB7. The cost of the bonds is to be included in the above Lump Sum Bid.

H) PREVAILING WAGE RATES:

Bidder acknowledges and affirms that it has personal knowledge of or has obtained and reviewed a copy of the valid prevailing wage rates for all trades involved in the project and confirmed the geographic location of the projects issued by the commissioner of the Department of Labor and Workforce Development, Trenton, NJ 08625.

I) CONSTRUCTION PERIOD:

The Bidder hereby agrees to commence work on the Project immediately upon formal award and written Notice to Proceed by the University and fully complete all work as stated in **Item H** (Time for Completion and Sequence of Operations) of the Supplemental Instructions for Bidding and Completing Proposal Form.

J) **ADDENDA:**

Bidder acknowledges receipt of the following addenda:

Addendum Number - Project

Date

K) **SUBCONTRACTORS INFORMATION:**

The Contractor for the General Construction Contract must identify the intended subcontractors and license numbers for mechanical, electrical, plumbing and structural trades with the submission of the Bid (if not used – write **NONE**). Listed subcontractors for these trades are also required to be DPMC classified in their respective trade

Mechanical LIC. NO. _____

Name _____

Address _____

Electrical LIC. NO. _____

Name _____

Address _____

Plumbing LIC. NO. _____

Name _____

Address _____

Structural LIC. NO. _____

Name _____

Address _____

L) CONTRACT DOCUMENTS:

1. Specifications Volume 1 and 2 provided by Settembrino Architects dated 5/19/23.
2. Plans dated 5/19/23 are defined by the list on Settembrino Architects drawing T-001. If there is additional plans that are included on the website that are not part listed on the title page, they are to be included in the contractors scope of work.
3. General Conditions dated 5/19/23
4. Supplemental General Conditions dated 5/19/23
5. Instructions to Bidders dated 5/19/23
6. Supplemental Instructions for Bidding and Completing Proposal Form 5/19/23
7. Addenda
8. Bid Form and Supplemental Documents submitted with bid

M) Having examined the Drawings and Specifications, related documents and having visited the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, the undersigned hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth herein, and at the price stated. This price includes all expenses incurred in performing the work required by the Contract Documents, of which this proposal is part.

(Seal - if bid is by a corporation)

Respectfully submitted,

By: _____
(Name of Firm)

(Signature)

(Title)

(Business Address)

(Telephone Number)

FEDERAL IDENTIFICATION NUMBER _____

Any change in ownership since filing your current financial/experience statement?
() Yes () No If yes, attach explanation.

Social Security Number

AFFIDAVIT

I/We hereby certify that I/We have read the foregoing conditions and specifications and have become familiar with the contents thereof; and that the bid of _____ submitted to William Paterson University, attached hereto, is submitted in strict accordance with said conditions, instructions, and specifications. Any matter submitted with the bid document attempting to alter the specifications of the University may be disregarded, or the bid may be rejected.

Corporate Name of Bidder

Address

Telephone Number

Signature of Authorized Agent

THE WILLIAM PATERSON UNIVERSITY OF NEW JERSEY
BID DOCUMENT CHECKLIST

WPU Fieldhouse Renovation & Addition Project
Project # : WP-22-01-27

Failure by the Bidder to submit the following documents may result in the Bid being deemed non-responsive. Documents listed under this section are included in the Bid Package and can be retrieved in WPU Capital Planning website: <http://www.wpunj.edu/capital-planning/rfp.html>

Document	Bidder to Initial Each Item on Checklist Required with Bid
WPU01 – Bid Document Checklist	
WPU03 – Bid Form, Signed and Sealed as required	
WPU-DOC-1 : Division of Property Management & Construction (DPMC) Notice of Classification for contractors and listed subcontractors (Sample attached in “Docs Attachment with ref number” folder)	N/A
WPU-DOC-2: DPMC – Notice of Uncompleted Contracts (Bidders only)	
WPU-DOC-3: Set Asides for Small Business Enterprises – Construction information	
WPU-DOC-4: Schedule of SBE Participation for Construction Firms	
WPU-DOC-5: SBE Affidavit of Outreach	
WPU-DOC-6: SBE Subcontractor Data Sheet	
WPU-DOC-7: Bid Security Form	
WPU-DOC-8: Available Bonding Capacity Form	
WPU-DOC-9: Non Collusion Affidavit	
WPU-DOC-10: Employee or Relative Disclosure Requirement	
WPU-DOC-11: Chapter 51/E.O. 117 Information & Instructions (3 pages)	
WPU-DOC-12 Two-Year Chapter 51/EEO 117 Vendor Certification & Disclosure of Political Contributions (3 pages).	
WPU-DOC-13: Disclosure of Investment Activities in Iran	
WPU-DOC-14: Copy of valid Certificate of Registration Issued pursuant to the “Public Works Contractor Registration Act	
WPU-DOC-15: Ownership Disclosure Form	

Prior to the award of the Contract, the Successful Bidder will have to submit the following documents. WPU will generate a Notice to Proceed upon receipt of all required Public Law documentation listed below.

Document	Bidder to submit each item on Checklist as required
WPU-DOC-16: Initial Project Workforce Report Construction (Form AA201)	
Business Registration Certificate issued by Department of Treasury, Division of Revenue – award Bidder and sub-contractors	
Sub-contractor Licenses	
W9 form of the award Contractor	
Certificate of Liability Insurance (refer to Article 13 of University Contract WPU07). Please include: William Paterson University, The State of New Jersey, the New Jersey Educational Facilities Authority and the William Paterson University Board of Trustees as additional insured parties on the Insurance Certificate.	
Performance Bonds (refer to IB-7 of Instructions to Bidders WPU05)	
Payment Bonds (refer to IB-7 of Instructions to Bidders WPU05)	
3 (Three) original executed contracts (Contract for signature will be sent to award Bidder with Notice to Proceed)	

The undersigned has submitted this Bid Document Checklist and is aware of required documentation for bidding, award and Notice to Proceed.

Name of Bidder: _____

Authorized Representative Signature: _____

Print Name: _____

Title: _____

Date: _____

----- END OF BID DOCUMENT CHECKLIST WPU01 -----

ASBESTOS ACKNOWLEDGEMENT FORM

TO ALL CONTRACTORS/WORKERS:

Pursuant to AHERA (Asbestos Hazard Emergency Response Act) Regulations, you are hereby informed that the Owner has conducted an inspection of its buildings for asbestos containing building materials. A Management Plan has been developed and approved. The plan identifies asbestos containing building materials, assesses their friability (the potential to be crumble or reduced to powder by hand pressure), and recommends action based upon the potential release of asbestos fibers.

You are hereby informed that you have the right to inspect the Management Plan prior to the commencement of your work. You are also directed to inform the Owner if you are going to be working in an area that may cause you to disturb any existing asbestos containing building materials.

Your signature below acknowledges that you have been informed prior to the commencement of work that you have been made aware of your rights under the AHERA Regulations. Each Prime Contractor shall notify his subcontractors of the above notification.

Name (printed)

Signature

Company Name (printed)

Date

THIS FORM SHALL BE SUBMITTED WITH THE BID.

BIDDER'S PERSONNEL AND EXPERIENCE

All questions must be answered and the data given must be clear and comprehensive.

This statement must be notarized. Attach separate letters where requested.

1. Name of Bidder: _____
2. Business Address: _____

3. Phone and Fax Numbers: _____
4. When Organized or Incorporated: _____
5. State where Incorporated: _____
6. How many years have you been engaged in the contracting business under your present firm or trading name? _____
7. General character of work performed by company. _____

8. Have you ever failed to complete any work awarded to your firm? _____ If so, where and for whom? _____

9. Have you ever defaulted on a Contract? _____ If so, where and why? _____

10. In the past three years, have there been any outstanding debts over 60 days to subcontractors or material/equipment suppliers for work in place of any of your contracts other than a maximum allowance of 10% for retainage? _____ If so, how much and why? _____

11. In the past three years, have there been any liens placed on any projects attributed to your contract or have there been any attempts to have any liens placed on any project attributed to your contract? _____ If so, explain the circumstances. _____

12. Have all payments associated with past labor costs (workers compensation, benefits, etc.) been paid in full to the proper authorities as required by law or agreements? _____ If no, explain _____

13. Attach schedule of current projects under construction with gross contract amount and uncompleted dollar amount of each project and anticipated completion dates. **
14. Attach schedule of major contracts including construction costs completed by your firm within the last three (3) years. **

15. Attach background and experience of principals of the firm. **
16. List names of projects, architects/clients and phone numbers to contact for references for projects in progress or completed in the last three (3) years. **

17. List Bank Reference:

**Attach separate sheets to this Statement of Bidders Personnel and Experience Sheet with Bid Proposal

18. List Trade References:

Signature of:

(Bidder, if Bidder is an Individual)

(Partner, if Bidder is a Partnership)

(Officer, if Bidder is a Corporation)

Sworn and subscribed before me this

_____ day of _____, 20_____.

NOTARY PUBLIC _____
(Signature)

(Print Name)

SEAL

Notary Public-State of _____
My Commission Expires _____

State of New Jersey

**DEPARTMENT OF THE TREASURY
DIVISION OF PROPERTY MANAGEMENT AND
CONSTRUCTION
33 WEST STATE STREET - P.O. BOX 042
TRENTON, NEW JERSEY 08625-0042**

**NOTICE OF CLASSIFICATION**

In accordance with N.J.S.A. 18A:18A-27 et seq (Department of Education) and N.J.S.A. 52:35-1 (Department of the Treasury) and any rules and regulations issued pursuant hereto, you are hereby notified of your classification to do State work for the Department (s) as previously noted.

Aggregate Amount	Trade(s) & License(s)	Effective Date	Expiration Date
Unlimited	C083 -BULKHEAD AND DOCKS C019 -CONCRETE/FOUND. FOOTINGS/MASONRY WORK C008 -GENERAL CONSTRUCTION C086 -PILE DRIVING C062 -PUMPING STATIONS C059 -ROAD CONSTRUCTION & PAVING C055 -SEWAGE AND WATER TREATMENT PLANTS C056 -SEWER PIPING & STORM DRAINS C110 -SIGNAGE AND GRAPHICS C054 -SITE WORK C035 -SOLAR ENERGY SYSTEMS C058 -UNDERGROUND WATER & UTILITIES	06/10/2012 06/10/2012 06/10/2012 06/10/2010 06/10/2012 06/10/2012 06/10/2012 06/10/2012 06/10/2010 06/10/2012 06/10/2012 06/10/2012	06/09/2014

- Licenses associated with certain trades are on file with the Division of Property Management & Construction (DPMC).
- Current license information must be verified prior to bid award.
- A copy of the DPMC 701 Form (Total Amount of Uncompleted Projects) may be accessed from the DPMC website at <http://www.state.nj.us/treasury/dpmc>.

ANY ATTEMPT BY A CONTRACTOR TO ALTER OR MISREPRESENT ANY INFORMATION CONTAINED IN THIS FORM MAY RESULT IN PROSECUTION AND/OR DEBARMENT, SUSPENSION OR DISQUALIFICATION. INFORMATION ON AGGREGATE AMOUNTS CAN BE VERIFIED ON THE DPMC WEB SITE.



State of New Jersey

WPU-DOC-2

DEPARTMENT OF THE TREASURY
DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION
33 W. STATE STREET
PO BOX 034
TRENTON, NEW JERSEY 08625-0042

REPLY TO:
TEL: (609) 943-3400
FAX: (609) 984-8495

**TOTAL AMOUNT OF
UNCOMPLETED CONTRACTS**

(This form is to be used with the NOTICE OF CLASSIFICATION when submitting bids to the Department of Education.)

I Certify that the amount of uncompleted work on contracts is \$ _____.

The amount claimed includes uncompleted portions of all currently held contracts from all sources (public and private) in accordance with N.J.A.C. 17:19-2.13.

I further certify that the amount of this bid proposal, including all outstanding incomplete contracts does not exceed my prequalification dollar limit.



Affix
corporate
seal
here

*Sworn to and
subscribed before me
This day of
20*

Notary Public

Respectfully submitted,

By _____

Name of Firm

Signature

Title

Business Address

Phone

Set Asides for Small Business Enterprises-Construction

The University requires bidders to make a good faith effort to provide practical opportunities for SBE firms to participate in the performance of this Contract as Subcontractors, consistent with the overall 25% SBE goal established for construction by the New Jersey Commerce and Economic Growth Commission (NJ Commerce), at N.J.A.C.12A:10A-4.-1(a) and Executive Order 71 signed by Governor James E. McGreevy in 2003. SBE subcontracting goals are not applicable if the Bidder is currently registered with the NJ Commerce as an SBE firm when the proposal is submitted.

All Bidders must submit a completed Schedule of SBE Participation for Construction Firms with their proposal either:

- a. Identifying the bidder as a registered SBE, and attaching a copy of the SBE Registration Certification, or;
- b. Identifying all SBE firms proposed as Subcontractors on the Project, including their NJ Commerce SBE Registration numbers, the SBE category in which they are registered and the proposed percentage of the Contract with each SBE Subcontractor is to perform.

Failure to submit this completed form shall disqualify the bid proposal.

All non-SBE bidders must complete the AFFIDAVIT OF OUTREACH. Bidders are expected to demonstrate the good faith efforts to reach the 25% SBE goal, as set forth in N.J.A.C. 17:14-4.3. If the bidder's Schedule of SBE Participation for Construction Firms fails to demonstrate that the bidder will meet the 25% SBE goal, the AFFIDAVIT OF OUTREACH with attached Subcontractor Data Sheets must provide a record of the bidder's efforts, attempts to contact eligible businesses, and the reasons for its failure to meet the Subcontracting targets, or a separate certification that the firm does not intend to subcontract any Work. Failure to demonstrate good faith efforts to provide subcontracting opportunities to SBE's may disqualify the bid proposal.

The University reserves the right, after the award of the Contract, to Work with Successful Bidder toward meeting unmet SBE subcontracting goals. The successful Bidder will not be permitted to substitute non-SBE Subcontractors for SBE Subcontractors without good cause and the written approval of the University.

William Paterson University
SCHEDULE OF SBE PARTICIPATION FOR CONSTRUCTION FIRMS

RFP NO: _____

PROJECT: _____

Name of SBE Construction Firm	SBE Category (4,5)	Address, Telephone Number & Contract Person	Trade	SBE Registration No.	Proposed % or Total Value	Final % of Total Contract Value*
TOTALS (of subcontract amount and % of Total Contract Value)						

* This information must be submitted at project completion.

_____ FIRM (Print Name) _____ PREPARED BY (Print Name) _____ BIDDER'S SBE REGISTRATION NO. (if applicable)

_____ SIGNATURE & TITLE _____

_____ FIRM ADDRESS _____

NOTE: The subcontracting targets for SBE on this contract are a minimum of 10% in Category 4, 15% in Category 5.

Category 4: SBEs with gross revenues not exceeding \$1,000,000

Category 5: SBEs with gross revenues not exceeding the applicable annual revenue standards set forth in 13 CFR 121.201

AFFIDAVIT OF OUTREACH
Construction Services
Small Business Enterprises - SBE

_____ *being duly sworn, deposes and says:*

- a. I understand that all bidders are expected to comply with all statutory and regulatory requirements of the New Jersey Set-Aside Program on Small Business Enterprises (SBE's) participation in state construction contracts (N.J.A.C. 12A:10A-1.1 et. seq.) I further understand that it is my responsibility as a bidder to obtain and familiarize myself with the above mentioned requirements.
- b. Pursuant to the above mentioned requirements, any attempts I make to engage subcontractors shall include a good faith outreach effort to engage Small Business Subcontractors in connection with this project.
- c. I have attached hereto a separate Schedule of SBE Participation accurately recording the outreach effort with respect to that particular subcontractor for each Small Business contacted by the bidder regarding this project.

WPU Project #: _____

Name of Firm

Signature _____ **Title** _____

Business Address _____

Telephone Number _____

Sworn to before me this _____ day of _____ 20____
Notary Public _____ **My Commission Expires** _____ 20____

SBE SUBCONTRACTOR DATA SHEET

INSTRUCTIONS: This form enables you to demonstrate your outreach efforts to engage small business subcontractors.

Please use one (1) sheet for each potential small business contacted.

1. Business Name: _____

2. Address and Telephone: _____

3. Name(s) of contact(s) at this business: _____

4. Describe the potential subcontract work on this project
For which this business was contacted about:

5. Did this potential subcontractor bid for the work
Described in Paragraph 4?

YES _____ or NO _____ (check one)

6. Would this business be awarded a subcontract if you are
awarded the prime contract?

YES _____ or NO _____ (check one)

7. If the answer to Question Six (6) is no, explain the reason for this decision:

BID SECURITY FORM

Know all Men by These Presents, that we, the undersigned,

as Principal, and _____

as Surety, are hereby held and firmly bound unto William Paterson University of New Jersey, as Owner in the penal sum of _____ Dollars (\$_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____ 20 ____

The condition of the above obligation is such that whereas the Principal has submitted a bid for the William Paterson University of New Jersey, Wayne, New Jersey,

Now therefore if said Bid shall be rejected, or in the alternate, if said Bid shall be accepted and the Principal shall execute and deliver a Contract properly completed in accordance with said Bid and shall furnish a bond for the faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith and shall in all other respects perform the agreement created by the acceptance of said Bid, then his obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation as herein stated.

IN WITNESS THEREOF, the Principal and Surety have duly executed this Bond under seal the date and year above written.

SEAL
(L.S.)

Principal

Surety

By

AVAILABLE BONDING CAPACITY FORM

A contractor is required to submit a letter from its surety confirming its current bonding capacity. Confirmation will not be accepted unless the insurance company is licensed and approved by the New Jersey Department of Banking and Insurance and is rated B+ or better by A.M. Best Company. With the bonding company's letter, the bonding agent must enclose his/her Power of Attorney or Attorney In-Fact signing authorization document issued by the insurance company.

Contractor: _____

Indicate the firm's bonding limit per project and the firm's aggregate bonding capacity.

- a) Single Project Limit: _____
- b) Aggregate Bonding Capacity: _____
- c) Bonds committed (submit list of bonded projects): _____
- d) Bonding Capacity Available [value of b) less value of c)]: _____

The Bidder must attach with their Bid a certificate from a Surety company stating that it will provide the Bidder with the required Performance and Payment Bonds in the specified amount and form.

Indicate name of present bonding agent, contact person, address, and telephone number:

Agent name: _____

Agent Address: _____

Contact Person Name: _____

Telephone Number: _____

Agent Signature
date

Contractor Signature
date

NON-COLLUSION AFFIDAVIT

State of New Jersey

County of _____

SS:

I, _____ residing in _____
(name of affiant) (name of municipality)
 in the County of _____ and State of _____ of full age,
 being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____
(title or position) (name of firm)

_____ the bidder making this Proposal for the bid

entitled _____, and that I executed the said proposal with
(title of bid proposal)

full authority to do so that said bidder has not, directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said proposal and in this affidavit are true and correct, and made with full knowledge that the _____ relies upon
(name of contracting unit)
 the truth of the statements contained in said Proposal

and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by

_____.

Subscribed and sworn to

before me this day

 Signature

_____, 2____

 (Type or print name of affiant under signature)

 Notary public of

My Commission expires _____

(Seal)

My Commission Expires _____, 20____

INFORMATION AND INSTRUCTIONS

For Completing the “Two-Year Vendor Certification and Disclosure of Political Contributions” Chapter 51 Form

Background Information

On September 22, 2004, then-Governor James E. McGreevey issued E.O. 134, the purpose of which was to insulate the negotiation and award of State contracts from political contributions that posed a risk of improper influence, purchase of access or the appearance thereof. To this end, E.O. 134 prohibited State departments, agencies and authorities from entering into contracts exceeding \$17,500 with individuals or entities that made certain political contributions. E.O. 134 was superseded by Public Law 2005, c. 51, signed into law on March 22, 2005 (“Chapter 51”).

On September 24, 2008, Governor Jon S. Corzine issued E.O. 117 which is designed to enhance New Jersey’s efforts to protect the integrity of procurement decisions and increase the public’s confidence in government. The Executive Order builds upon the provisions of Chapter 51.

Two-Year Certification Process

Upon approval by the State Chapter 51 Review Unit, the Certification and Disclosure of Political Contributions form is valid for a two (2) year period. Thus, if a vendor receives approval on January 1, 2014, the certification expiration date would be December 31, 2015. Any change in the vendor’s ownership status and/or political contributions during the two-year period will require the submission of new Chapter 51/Executive Order 117 forms to the State Review Unit. **Please note that it is the vendor’s responsibility to file new forms with the State should these changes occur.**

State Agency Instructions: Prior to the awarding of a contract, the State Agency should first use NJSTART (<https://www.njstart.gov/bso/>) to check the status of a vendor’s Chapter 51 certification before contacting the Review Unit’s mailbox at CD134@treas.nj.gov. If the State Agency does not find any Chapter 51 Certification information in NJSTART and/or the vendor is not registered in NJSTART, then the State Agency should send an e-mail to CD134@treas.nj.gov to verify the certification status of the vendor. If the response is that the vendor is NOT within an approved two-year period, then forms must be obtained from the vendor and forwarded for review. If the response is that the vendor is within an approved two-year period, then the response so stating should be placed with the bid/contract documentation for the subject project.

Instructions for Completing the Form

Part 1: BUSINESS ENTITY INFORMATION

Business Name – Enter the full legal name of the vendor, including trade name if applicable.

Address, City, State, Zip and Phone Number -- Enter the vendor's street address, city, state, zip code and telephone number.

Vendor Email – Enter the vendor’s primary email address.

Vendor FEIN – Please enter the vendor’s Federal Employment Identification Number.

Business Type - Check the appropriate box that represents the vendor's type of business formation.

Listing of officers, shareholders, partners or members - Based on the box checked for the business type, provide the corresponding information. (A complete list must be provided.)

Part 2: DISCLOSURE OF CONTRIBUTIONS

Read the three types of political contributions that require disclosure and, if applicable, provide the recipient's information. The definition of "Business Entity/Vendor" and "Contribution" can be found on pages 3 and 4 of this form.

Name of Recipient - Enter the full legal name of the recipient.

Address of Recipient - Enter the recipient's street address.

Date of Contribution - Indicate the date the contribution was given.

Amount of Contribution - Enter the dollar amount of the contribution.

Type of Contribution - Select the type of contribution from the examples given.

Contributor's Name - Enter the full name of the contributor.

Relationship of the Contributor to the Vendor - Indicate the relationship of the contributor to the vendor. (e.g. officer or shareholder of the company, partner, member, parent company of the vendor, subsidiary of the vendor, etc.)

NOTE: If form is being completed electronically, click "Add a Contribution" to enter additional contributions. Otherwise, please attach additional pages as necessary.

Check the box under the recipient information if no reportable contributions have been solicited or made by the business entity. **This box must be checked if there are no contributions to report.**

Part 3: CERTIFICATION

Check Box A if the representative completing the Certification and Disclosure form is doing so on behalf of the business entity and all individuals and/or entities whose contributions are attributable to the business entity.

(No additional Certification and Disclosure forms are required if BOX A is checked.)

Check Box B if the representative completing the Certification and Disclosure form is doing so on behalf of the business entity and all individuals and/or entities whose contributions are attributable to the business entity with the exception of those individuals and/or entities that submit their own separate form. For example, the representative is not signing on behalf of the vice president of a corporation, but all others. The vice president completes a separate Certification and Disclosure form. **(Additional Certification and Disclosure forms are required from those individuals and/or entities that the representative is not signing on behalf of and are included with the business entity's submittal.)**

Check Box C if the representative completing the Certification and Disclosure form is doing so on behalf of the business entity only. **(Additional Certification and Disclosure forms are required from all individuals and/or entities whose contributions are attributable to the business entity and must be included with the business entity submittal.)**

Check Box D when a sole proprietor is completing the Certification and Disclosure form or when an individual or entity whose contributions are attributable to the business entity is completing a separate Certification and Disclosure form.

Read the five statements of certification prior to signing.

The representative authorized to complete the Certification and Disclosure form must sign and print her/his name, title or position and enter the date.

State Agency Procedure for Submitting Form(s)

The State Agency should submit the completed and signed Two-Year Vendor Certification and Disclosure forms either electronically to: cd134@treas.nj.gov or regular mail at: Chapter 51 Review Unit, P.O. Box 230, 33 West State Street, Trenton, NJ 08625-0230. Original forms should remain with the State Agency and copies should be sent to the Chapter 51 Review Unit.

Business Entity Procedure for Submitting Form(s)

The business entity should return this form to the contracting State Agency.

The business entity can submit the Certification and Disclosure form directly to the Chapter 51 Review Unit only when:

- The business entity is approaching its two-year certification expiration date and is seeking certification renewal;
- The business entity had a change in its ownership structure; OR
- The business entity made any contributions during the period in which its last two-year certification was in effect, or during the term of a contract with a State Agency.

Questions & Information

Questions regarding Public Law 2005, Chapter 51 (N.J.S.A. 19:44A-20.13) or E.O. 117 (2008) may be submitted electronically through the Division of Purchase and Property website at: <https://www.state.nj.us/treas/purchase/eo134questions.shtml>.

Reference materials and forms are posted on the Political Contributions Compliance website at: <http://www.state.nj.us/treasury/purchase/execorder134.shtml>.



Division of Purchase and Property

Two-Year Chapter 51/Executive Order 117 Vendor Certification and
Disclosure of Political Contributions

FOR STATE USE ONLY

Solicitation, RFP, or Contract No. _____ Award Amount _____

Description of Services _____

State Agency Name _____ Contact Person _____

Phone Number _____ Contact Email _____

☐ Check if the Contract / Agreement is Being Funded Using FHWA Funds

**Please check if requesting
recertification ☐**

Part 1: Business Entity Information

Full Legal Business Name _____
(Including trade name if applicable)

Address _____

City _____ State _____ Zip _____ Phone _____

Vendor Email _____ Vendor FEIN (SS# if sole proprietor/natural person) _____

**Check off the business type and list below the required information for the type of business selected.
MUST BE COMPLETED IN FULL**

- ☐ Corporation: LIST ALL OFFICERS and any 10% and greater shareholder (If the corporation only has one officer, please write "sole officer" after the officer's name.)
- ☐ Professional Corporation: LIST ALL OFFICERS and ALL SHAREHOLDERS
- ☐ Partnership: LIST ALL PARTNERS with any equity interest
- ☐ Limited Liability Company: LIST ALL MEMBERS with any equity interest
- ☐ Sole Proprietor

Note: "Officers" means President, Vice President with senior management responsibility, Secretary, Treasurer, Chief Executive Officer or Chief Financial Officer of a corporation, or any person routinely performing such functions for a corporation.

Also Note: "N/A will not be accepted as a valid response. Where applicable, indicate "None."

All Officers of a Corporation or PC

**10% and greater shareholders of a corporation
or all shareholders of a PC**

All Equity partners of a Partnership

All Equity members of a LLC

If you need additional space for listing of Officers, Shareholders, Partners or Members, please attach separate page.

Part 2: Disclosure of Contributions by the business entity or any person or entity whose contributions are attributable to the business entity.

- 1. Report below all contributions solicited or made during the 4 years immediately preceding the commencement of negotiations or submission of a proposal to any:**

Political organization organized under Section 527 of the Internal Revenue Code and which also meets the definition of a continuing political committee as defined in N.J.S.A. 19:44A-3(n)

- 2. Report below all contributions solicited or made during the 5 ½ years immediately preceding the commencement of negotiations or submission of a proposal to any:**

Candidate Committee for or Election Fund of any Gubernatorial or Lieutenant Gubernatorial candidate
State Political Party Committee
County Political Party Committee

- 3. Report below all contributions solicited or made during the 18 months immediately preceding the commencement of negotiations or submission of a proposal to any:**

Municipal Political Party Committee
Legislative Leadership Committee

Full Legal Name of Recipient _____

Address of Recipient _____

Date of Contribution _____ Amount of Contribution _____

Type of Contribution (i.e. currency, check, loan, in-kind) _____

Contributor Name _____

Relationship of Contributor to the Vendor _____

If this form is not being completed electronically, please attach additional contributions on separate page.

Click the "Add a Contribution" tab to enter additional contributions.

Remove Contribution

Add a Contribution

☐ **Check this box only if no political contributions have been solicited or made by the business entity or any person or entity whose contributions are attributable to the business entity.**

Part 3: Certification (Check one box only)

- (A) ☐ I am certifying on behalf of the business entity and all individuals and/or entities whose contributions are attributable to the business entity as listed on Page 1 under **Part 1: Vendor Information**.
- (B) ☐ I am certifying on behalf of the business entity and all individuals and/or entities whose contributions are attributable to the business entity as listed on Page 1 under **Part 1: Vendor Information**, except for the individuals and/or entities who are submitting separate Certification and Disclosure forms which are included with this submittal.
- (C) ☐ I am certifying on behalf of the business entity only; any remaining persons or entities whose contributions are attributable to the business entity (as listed on Page 1) have completed separate Certification and Disclosure forms which are included with this submittal.
- (D) ☐ I am certifying as an individual or entity whose contributions are attributable to the business entity.

I hereby certify as follows:

- 1. I have read the Information and Instructions accompanying this form prior to completing the certification on behalf of the business entity.**
- 2. All reportable contributions made by or attributable to the business entity have been listed above.**

3. The business entity has not knowingly solicited or made any contribution of money, pledge of contribution, including in-kind contributions, that would bar the award of a contract to the business entity unless otherwise disclosed above:

- a) Within the 18 months immediately preceding the commencement of negotiations or submission of a proposal for the contract or agreement to:
 - (i) A candidate committee or election fund of any candidate for the public office of Governor or Lieutenant Governor or to a campaign committee or election fund of holder of public office of Governor or Lieutenant Governor; OR
 - (ii) Any State, County or Municipal political party committee; OR
 - (iii) Any Legislative Leadership committee.
- b) During the term of office of the current Governor or Lieutenant Governor to:
 - (i) A candidate committee or election fund of a holder of the public office of Governor or Lieutenant Governor; OR
 - (ii) Any State or County political party committee of the political party that nominated the sitting Governor or Lieutenant Governor in the last gubernatorial election.
- c) Within the 18 months immediately preceding the last day of the sitting Governor or Lieutenant Governor's first term of office to:
 - (i) A candidate committee or election fund of the incumbent Governor or Lieutenant Governor; OR
 - (ii) Any State or County political party committee of the political party that nominated the sitting Governor or Lieutenant Governor in the last gubernatorial election.

4. During the term of the contract/agreement the business entity has a continuing responsibility to report, by submitting a new Certification and Disclosure form, any contribution it solicits or makes to:

- (a) Any candidate committee or election fund of any candidate or holder of the public office of Governor or Lieutenant Governor; OR
- (b) Any State, County or Municipal political party committee; OR
- (c) Any Legislative Leadership committee.

The business entity further acknowledges that contributions solicited or made during the term of the contract/agreement may be determined to be a material breach of the contract/agreement.

5. During the two-year certification period the business entity will report any changes in its ownership structure (including the appointment of an officer within a corporation) by submitting a new Certification and Disclosure form indicating the new owner(s) and reporting said owner(s) contributions.

I certify that the foregoing statements in Parts 1, 2 and 3 are true. I am aware that if any of the statements are willfully false, I may be subject to punishment.

Signed Name _____ Print Name _____

Title/Position _____ Date _____

Procedure for Submitting Form(s)

The contracting State Agency should submit this form to the Chapter 51 Review Unit when it has been required as part of a contracting process. The contracting State Agency should submit a copy of the completed and signed form(s), to the Chapter 51 Unit and retain the original for their records.

The business entity should return this form to the contracting State Agency. The business entity can submit this form directly to the Chapter 51 Review Unit only when it -

- Is approaching its two-year certification expiration date and wishes to renew certification;
- Had a change in its ownership structure; OR
- Made any contributions during the period in which its last two-year certification was in effect, or during the term of a contract with a State Agency.

Forms should be submitted either electronically to: cd134@treas.nj.gov, or regular mail at: Chapter 51 Review Unit, P.O. Box 230, 33 West State Street, Trenton, NJ 08625.

Certificate Number

Registration Date:
Expiration Date:



State of New Jersey

Department of Labor and Workforce Development Division of Wage and Hour Compliance

Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

2013

Responsible Representative(s):
Michael Bencivenga, President

A handwritten signature in black ink, reading "Harold J. Wirths".

Harold J. Wirths, Commissioner
Department of Labor and Workforce Development

NON TRANSFERABLE

This certificate may not be transferred or assigned
and may be revoked for cause by the Commissioner
of Labor and Workforce Development.



**STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY
DIVISION OF PURCHASE AND PROPERTY**

33 WEST STATE STREET, P.O. BOX 230
TRENTON, NEW JERSEY 08625-0230

OWNERSHIP DISCLOSURE FORM

BID SOLICITATION #: _____ VENDOR/BIDDER: _____

PART 1

PLEASE COMPLETE THE QUESTIONS BELOW BY CHECKING EITHER THE "YES" OR THE "NO" BOX. ALL PARTIES ENTERING INTO A CONTRACT WITH THE STATE ARE REQUIRED TO COMPLETE THIS FORM PURSUANT TO N.J.S.A. 52:25-24.2

PLEASE NOTE THAT IF THE VENDOR/BIDDER IS A NON-PROFIT ENTITY, THIS FORM IS NOT REQUIRED.

- | | YES | NO |
|--|--------------------------|--------------------------|
| 1. Are there any individuals, corporations, partnerships, or limited liability companies owning a 10% or greater interest in the Vendor/Bidder? | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>IF THE ANSWER TO QUESTION 1 IS "NO", PLEASE SIGN AND DATE THE FORM.
 IF THE ANSWER TO QUESTION 1 IS "YES", PLEASE ANSWER QUESTIONS 2 – 4 BELOW.</p> | | |
| 2. Of those parties owning a 10% or greater interest in the Vendor/Bidder, are any of those parties individuals? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Of those parties owning a 10% or greater interest in the Vendor/Bidder, are any of those parties corporations, partnerships, or limited liability companies? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. If your answer to Question 3 is "YES", are there any parties owning a 10% or greater interest in the corporation, partnership, or limited liability company referenced in Question 3? | <input type="checkbox"/> | <input type="checkbox"/> |

IF ANY OF THE ANSWERS TO QUESTIONS 2 - 4 ARE "YES", PLEASE PROVIDE THE REQUESTED INFORMATION IN PART 2 BELOW.

PART 2

PLEASE PROVIDE FURTHER INFORMATION RELATED TO QUESTIONS 2 – 4 ANSWERED AS "YES".

If you answered "YES" for questions 2, 3, or 4, you must disclose identifying information related to the individuals, corporations, partnerships, and/or limited liability companies owning a 10% or greater interest in the Vendor/Bidder. Further, if one or more of these entities is itself a corporation, partnership, or limited liability company, you must also disclose all parties that own a 10% or greater interest in that corporation, partnership, or limited liability company. This information is required by statute.

INDIVIDUALS

NAME	_____	DATE OF BIRTH	_____
ADDRESS 1	_____		
ADDRESS 2	_____		
CITY	_____	STATE	_____
		ZIP	_____

NAME	_____	DATE OF BIRTH	_____
ADDRESS 1	_____		
ADDRESS 2	_____		
CITY	_____	STATE	_____
		ZIP	_____

NAME	_____	DATE OF BIRTH	_____
ADDRESS 1	_____		
ADDRESS 2	_____		
CITY	_____	STATE	_____
		ZIP	_____

Attach Additional Sheets If Necessary.

PART 2 continued**PARTNERSHIPS/CORPORATIONS/LIMITED LIABILITY COMPANIES**

ENTITY NAME			
PARTNER NAME			
ADDRESS 1			
ADDRESS 2			
CITY	STATE	ZIP	

ENTITY NAME			
PARTNER NAME			
ADDRESS 1			
ADDRESS 2			
CITY	STATE	ZIP	

ENTITY NAME			
PARTNER NAME			
ADDRESS 1			
ADDRESS 2			
CITY	STATE	ZIP	

ENTITY NAME			
PARTNER NAME			
ADDRESS 1			
ADDRESS 2			
CITY	STATE	ZIP	

Attach Additional Sheets If Necessary.

In the alternative, to comply with the ownership disclosure requirement, a Vendor/Bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10% or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10% or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest. N.J.S.A. 52:25-24.2.

CERTIFICATION

I, the undersigned, certify that I am authorized to execute this certification on behalf of the Vendor/Bidder, that the foregoing information and any attachments hereto, to the best of my knowledge are true and complete. I acknowledge that the State of New Jersey is relying on the information contained herein, and that the Vendor/Bidder is under a continuing obligation from the date of this certification through the completion of any contract(s) with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification. If I do so, I will be subject to criminal prosecution under the law, and it will constitute a material breach of my agreement(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Signature (Do not enter vendor ID as a signature)

Date

Print Name and Title

FEIN/SSN

STATE OF NEW JERSEY

DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
CONSTRUCTION EEO COMPLIANCE MONITORING PROGRAM

WPU-DOC-16

Official Use Only

Assignment

Code

FORM AA-201

Revised 11/11

INITIAL PROJECT WORKFORCE REPORT CONSTRUCTION

For instructions on completing the form, go to: http://www.state.nj.us/treasury/contract_compliance/pdf/aa201ins.pdf

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

I hereby certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements are willfully false, I am subject to punishment.

(Signature)

10. (Please Print Your Name)

(Title)

(Area Code)

(Telephone Number)

(Ext.)

(Date)

CONSENT OF SURETY

The _____

(Name and Address of Surety)

a corporation existing under the Laws of the State of _____ and authorized to do
business under the Laws of the State of New Jersey, hereby certifies that application has been made to us by

(Name and Address of Contractor)

and satisfactory arrangements have been completed by which we have and do now agree to furnish a
Performance Bond equal to 100% of the Contract to ensure the faithful performance on the part of the Bidder of
the terms and conditions of the contract, and a labor and materials bond to ensure the payment of all persons
furnishing labor and materials in accordance with the contract.

Title Work: _____

Name and Location of Project: _____

This proposition is made with the understanding that any change made in the specifications or agreements without the consent of the bondsmen shall in no way vitiate the bond.

WITNESS:

SURETY COMPANY

Title: _____
Attorney-in-fact

By: _____

Date: _____

(Affix corporate seal)

SURETY DISCLOSURE STATEMENT AND CERTIFICATION
(Sample Form - Refer to Page 5 of the Instructions to Bidders)

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

(a) The surety meets the applicable capital and surplus requirements of R.S. 17:17-6 or R.S. 17:17-7 as of the surety's most current annual filing with the New Jersey Department of Insurance.

(b) The capital (where applicable) and surplus, as determined in accordance with the applicable laws of this State, of the surety(ies) participating in the issuance of the attached bond is (are) in the following amount(s) as of the calendar year ended December 31, _____ (most recent calendar year for which capital and surplus amounts are available), which amounts have been certified as indicated by certified public accountants (indicating separately for each surety that surety's capital and surplus amounts, together with the name and address of the firm of certified public accounts that shall have certified those amounts):

(c) (i) With respect to each surety participating in the issuance of the attached bond that has received from the United States Secretary of the Treasury a certificate of authority pursuant to 31 U.S.C. ' 9305, the underwriting limitation established therein and the date as of which that limitation was effective is as follows (indicating for each such surety that surety's underwriting limitation and the effective date thereof):

(ii) With respect to each surety participating in the issuance of the attached bond that has not received such a certificate of authority from the United States Secretary of the Treasury, the underwriting limitation of that surety as established pursuant to R.S. 17:18-9 as of (date on which such limitation was so established) is as follows (indicating for each such surety that surety's underwriting limitation and the date on which that limitation was established):

(d) The amount of the bond to which this statement and certification is attached is \$_____.

(e) If, by virtue of one or more contracts of reinsurance, the amount of the bond indicated under item (4) above exceeds the total underwriting limitation of all sureties on the bond as set forth in items (3)(a) or (3)(b) above, or both, then for each such contract of reinsurance:

(i) The name and address of each such reinsurer under that contract and the amount of that reinsurer's participation in the contract is as follows:

_____; and

(ii) Each surety that is party to any such contract of reinsurance certifies that each reinsurer listed under item (5)(a) satisfies the credit for reinsurance requirement.

CERTIFICATE
(to be completed by an authorized certifying agency
for each surety on the bond)

I, _____ (name of agent), as _____ (title of agent)
for _____ (name of surety), a corporation/mutual insurance company/other (indicating type of
business organization) (circle one) domiciled in _____ (state of domicile), DO HEREBY CERTIFY
that to the best of my knowledge, the foregoing statements made by me are true and ACKNOWLEDGE that,
if any of those statements are false, this bond is VOIDABLE.

(Signature of certifying agent)

(Printed name of certifying agent)

(Title of certifying agent)

SAMPLE PERFORMANCE BOND
(Sample Form – Refer to Page 5 of the Instructions to Bidders)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____, as Principal, and _____ SURETY COMPANY, a corporation of the State of _____ duly authorized to do business in the State of New Jersey, having an office at _____, are hereby held and firmly bound unto the _____ in the penal sum of _____ Dollars, for payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this _____ day of _____, 20_____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT, WHEREAS, the above named Principal did on the _____ day _____, 20_____ enter into a written contract with the _____ for _____

_____ which said contract is made a part of this bond as set forth herein.

NOW, if the said _____ shall well and faithfully do and perform the things agreed by _____ to be done and performed according to the terms of the said contract, and shall pay all lawful claims of beneficiaries as defined by N.J.S.A. 2A:44-143 for labor performed or materials, provisions, provender or other supplies or teams, fuels, oils, implements or machinery furnished, used or consumed in the carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any beneficiary as defined in N.J.S.A. 2A:44-143 having a just claim, as well as for the obligee herein; then this obligation shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulated and agrees that no modifications, omissions or additions in or to the terms of the said contract, or in or to the plans or specifications therefore shall in any wise effect the obligation of said surety on its bond.

This bond is given in compliance with the requirements of the statutes of the State of New Jersey in respect to bonds on contractors on public works. Revised Statutes of New Jersey, 1937, Sections 2A:44-143-147, and amendments thereof, and liability hereunder is limited as in said statutes provided.

Witness

Principal

Witness as to Surety

AFFIDAVIT OF NONCOLLUSION

STATE OF _____)

ss:

COUNTY OF _____)

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

I am _____ of the firm of _____, the
bidder making the proposal for the above named project. I executed the bid with full authority to do so. The
bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise
taken any action in restraint of free, competitive bidding in connection with the above named project. All
statements contained in bid and in this affidavit are true and correct, and made with the full knowledge that the
William Paterson University will rely upon the truth of the statements contained in the Bid and in the statements
contained in this affidavit in awarding the contract for the project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure
such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee.

Subscribed and sworn to before me this
_____ day of _____, 20____.

Notary Public of _____
My Commission expires ____/____/20____

AFFIRMATIVE ACTION AFFIDAVIT
FOR COMPLIANCE WITH AFFIRMATIVE ACTION REGULATIONS

STATE OF _____)

: ss:

COUNTY OF _____)

_____ being duly sworn, according to law,
deposes and says that he is a duly authorized representative of the Bidder,
_____.

I hereby certify that I am aware of the equal employment opportunity and affirmative action in public contracting requirements set forth in N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27-1 et seq. and that the Bidder is in compliance with the requirements therein. I hereby agree that the Bidder shall make good faith efforts to provide equal employment opportunity for minorities and women. I am aware that the failure to make good faith efforts to provide equal employment opportunity for minorities and women may result in fines/penalties, suspension/debarment, a determination to lower the firm's aggregate rating or such other action as provided by law.

Sworn to and subscribed
to this _____ day of _____,
_____, 20__

By: _____
Signature of Principal

(Name)

Notary Public of New Jersey
My Commission expires __/__/__

(Title)

Instructions for Completing
the
Payroll Certification for Public Work Projects (form MW-352)
and
Annual Equal Pay Report for Qualifying Services (form MW-353)

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Background

This Equal Pay Report (“Report”) is collected under the authority of P.L. 2018, c. 9, the “Diane B. Allen Equal Pay Act,” which was signed into law by Governor Murphy on April 24, 2018.

The purpose of the law is to strengthen protections against employment discrimination and promote equal pay for all groups afforded protection against discrimination under the New Jersey Law Against Discrimination (“LAD”), N.J.S.A. 10:5-1 et seq. The law clarifies that it is an unlawful employment practice for an employer to discriminate against an employee by paying a rate of compensation to employees of a protected class which is less than the rate paid to employees not of the class for substantially similar work. Additionally, the law imposes a pay reporting requirement upon any employer who enters into a contract with a public body to provide public work or qualifying services, as defined below.

In the interest of consistency, uniformity, and economy, these forms have been developed by the Department for use by employers. Given the federal government’s long experience with collecting the relevant information on its EEO-1 form, the Department has adopted similar instructions for these forms. These instructions may be applicable to Reports for Qualifying Services, Reports for Public Works, or both.

Generally, employers filing Reports for Public Works will not see substantial changes in their current weekly reporting requirements under the Prevailing Wage Act. These employers must now add information on employees’ sex, race, and ethnicity, and must submit Reports weekly to the Department. These submissions may be new to employers filing Reports for Qualifying Services, however.

The filing of these Reports is required by law and is not voluntary.

Definitions

“Establishment” means a physical location where business is conducted or where services or industrial operations are performed (e.g. a factory, mill, store, hotel, movie theater, mine, farm, airline terminal, sales office, warehouse, or central administrative office).

“Public body” means the State or any agency or instrumentality of the State, and does not include county or local governments.

Public work” means public work as defined in N.J.S.A. 34:11-56.26(5) and is subject to the provisions of the Prevailing Wage Act, N.J.S.A. 34:11-56.25 et seq. “Public work” shall not include the provisions of goods or products. “Public work” is defined at N.J.S.A. 34:11-56.26(5) as:

construction, reconstruction, demolition, alteration, custom fabrication, or repair work, or maintenance work, including painting and decorating, done under contract and paid for in whole or in part out of the funds of a public body, except work performed under a rehabilitation program. “Public work” shall also mean construction, reconstruction, demolition, alteration, custom fabrication, or repair work, done on any property or premises, whether or not the work is paid for from public funds, if, at the time of the entering into of the contract the property or premises is owned by the public body or:

(a) Not less than 55% of the property or premises is leased by a public body, or is subject to an agreement to be subsequently leased by the public body; and

(b) The portion of the property or premises that is leased or subject to an agreement to be subsequently leased by the public body measures more than 20,000 square feet.

“Qualifying services” means the provision of any service to the State or to any other public body, except for public work.

“Service” means any act performed in exchange for payment, including the provision of professional services, but shall not include the sale of goods or products.

Who Must File

Any employer, regardless of location, who enters into a contract with a public body to provide qualifying services or public work must file a Report.

How to File

The Department requires that Reports be filed electronically and emailed to equalpayact@dol.nj.gov.

Single-establishment employers doing business at only one establishment in one location must complete a single Report.

Multi-establishment employers doing business at more than one establishment must complete additional Reports. Such employers must complete:

1. A Report covering the principal or headquarters office;
2. A separate Report for each establishment employing 50 or more employees; and,
3. A consolidated Report for all establishments employing 50 or fewer employees.

For establishments involving physically dispersed activities it is not necessary to list separately each individual site, project, field, line, etc., unless the employer treats it as a separate legal entity. For these types of activities, list as establishments only those relatively permanent main or branch offices, terminals, stations, etc., which are either:

- (a) directly responsible for supervising such dispersed activities; or
- (b) the base from which personnel and equipment operate to carry out these activities.

When to File

For employers filing Reports for Qualifying Services, Reports must be submitted annually by **March 31** for the preceding year, using employment figures from any pay period in October through December.

For employers filing Reports for Public Works Projects, Reports must be submitted weekly.

Description of Job Categories (Qualifying Services Only)

The Equal Pay Act requires the Department to collect pay data sorted by job categories, which are broad-based employment categories. Employers filing a Report for Public Works should continue the same reporting of job titles, work classifications, and occupational categories as is currently required by the Prevailing Wage Act.

For employers filing a Report for Qualifying Services, the Department has adopted the job categories used in the federal government's EEO-1 report. The major job categories are listed below, including a brief description of the skills and training required for occupations in that category and examples of the job titles that fit each category. The examples shown below are illustrative and not intended to be exhaustive of all job titles in a job category. These job categories are primarily based on the average skill level, knowledge, and responsibility involved in each occupation within the job category. **All reported jobs must be placed into one of the below job categories.**

The Officials and Managers category as a whole is to be divided into the following two subcategories: Executive/Senior Level Officials and Managers, and First/Mid Level Officials and Managers. These subcategories are intended to mirror the employers own well established hierarchy of management positions. Small employers who may not have two well-defined hierarchical steps of management should report their management employees in the appropriate categories.

Executive/Senior Level Officials and Managers

Individuals who plan, direct and formulate policies, set strategy and provide the overall direction of enterprises/organizations for the development and delivery of products or services, within the parameters approved by boards of directors or other governing bodies. Residing in the highest levels of organizations, these executives plan, direct or coordinate activities with the support of subordinate executives and staff managers. They include, in larger organizations, those individuals within two reporting levels of the CEO, whose responsibilities require frequent interaction with the CEO.

Examples of these kinds of managers are: chief executive officers, chief operating officers, chief financial officers, line of business heads, presidents or executive vice presidents of functional areas or operating groups, chief information officers, chief human resources officers, chief marketing officers, chief legal officers, management directors and managing partners.

First/Mid Level Officials and Managers

Individuals who serve as managers, other than those who serve as Executive/Senior Level Officials and Managers, including those who oversee and direct the delivery of products, services or functions at group, regional or divisional levels of organizations. These managers receive directions from the Executive/Senior Level management and typically lead major business units. They implement policies, programs and directives of executive/senior management through subordinate managers and within the parameters set by Executive/Senior Level management.

Examples of these kinds of managers are: vice presidents and directors, group, regional or divisional controllers; treasurers; human resources, information systems, marketing, and operations managers.

The First/Mid Level Officials and Managers subcategory also includes those who report directly to middle managers. These individuals serve at functional, line of business segment or branch levels and are responsible for directing and executing the day-to-day operational objectives of enterprises/organizations, conveying the directions of higher level officials and managers to subordinate personnel and, in some instances, directly supervising the activities of exempt and non-exempt personnel.

Examples of these kinds of managers are: first-line managers; team managers; unit managers; operations and production managers; branch managers; administrative services managers; purchasing and transportation managers; storage and distribution managers; call center or customer service managers; technical support managers; and brand or product managers.

Professionals

Most jobs in this category require bachelor and graduate degrees, and/or professional certification. In some instances, comparable experience may establish a person's qualifications.

Examples of these kinds of positions include: accountants and auditors; airplane pilots and flight engineers; architects; artists; chemists; computer programmers; designers; dieticians; editors; engineers; lawyers; librarians; mathematical scientists; natural scientists; registered nurses; physical scientists; physicians and surgeons; social scientists; teachers; and surveyors.

Technicians

Jobs in this category include activities that require applied scientific skills, usually obtained by post-secondary education of varying lengths, depending on the particular occupation, recognizing that in some instances additional training, certification, or comparable experience is required.

Examples of these types of positions include: drafters; emergency medical technicians; chemical technicians; and broadcast and sound engineering technicians.

Sales Workers

These jobs include non-managerial activities that wholly and primarily involve direct sales.

Examples of these types of positions include: advertising sales agents; insurance sales agents; real estate brokers and sales agents; wholesale sales representatives; securities, commodities, and financial services sales agents; telemarketers; demonstrators; retail salespersons; counter and rental clerks; and cashiers.

Administrative Support Workers

These jobs involve non-managerial tasks providing administrative and support assistance, primarily in office settings.

Examples of these types of positions include: office and administrative support workers; bookkeeping; accounting and auditing clerks; cargo and freight agents; dispatchers; couriers; data entry keyers; computer operators; shipping, receiving and traffic clerks; word processors and typists; proofreaders; desktop publishers; and general office clerks.

Craft Workers

Most jobs in this category include higher skilled occupations in construction (building trades craft workers and their formal apprentices) and natural resource extraction workers.

Examples of these types of positions include: boilermakers; brick and stone masons; carpenters; electricians; painters (both construction and maintenance); glaziers; pipelayers, plumbers, pipefitters and steamfitters; plasterers; roofers; elevator installers; earth drillers; derrick operators; oil and gas rotary drill operators; and blasters and explosive workers.

This category also includes occupations related to the installation, maintenance and part replacement of equipment, machines and tools, such as: automotive mechanics; aircraft mechanics; and electric and electronic equipment repairers.

This category also includes some production occupations that are distinguished by the high degree of skill and precision required to perform them, based on clearly defined task specifications, such as: millwrights; etchers and engravers; tool and die makers; and pattern makers.

Operatives

Most jobs in this category include intermediate skilled occupations and include workers who operate machines or factory-related processing equipment. Most of these occupations do not usually require more than several months of training.

Examples include: textile machine workers; laundry and dry cleaning workers; photographic process workers; weaving machine operators; electrical and electronic equipment assemblers; semiconductor

processors; testers, graders and sorters; bakers; and butchers and other meat, poultry and fish processing workers.

This category also includes occupations of generally intermediate skill levels that are concerned with operating and controlling equipment to facilitate the movement of people or materials, such as: bridge and lock tenders; truck, bus or taxi drivers; industrial truck and tractor (forklift) operators; parking lot attendants; sailors; conveyor operators; and hand packers and packagers.

Laborers and Helpers

Jobs in this category include workers with more limited skills who require only brief training to perform tasks that require little or no independent judgment.

Examples include: production and construction worker helpers; vehicle and equipment cleaners; laborers; freight, stock and material movers; service station attendants; construction laborers; refuse and recyclable materials collectors; septic tank servicers; and sewer pipe cleaners.

Service Workers

Jobs in this category include food service, cleaning service, personal service, and protective service activities. Skill may be acquired through formal training, job-related training or direct experience.

Examples of food service positions include: cooks; bartenders; and other food service workers.

Examples of personal service positions include: medical assistants and other healthcare support positions; hairdressers; ushers; and transportation attendants.

Examples of cleaning service positions include: cleaners; janitors; and porters.

Examples of protective service positions include: transit and railroad police and fire fighters; guards; private detectives and investigators.

Identification of an Employee's Sex, Race, and Ethnicity (Qualifying Services and Public Works)

The Department recognizes that identifying an employee's sex, race, and ethnicity can be a sensitive subject. However, accurate reporting of this information is necessary to achieve the Equal Pay Act's goal of ending pay discrimination. To that end, **this information must be reported for every employee and cannot be left blank.**

Voluntary self-identification is the preferred method of identifying an employee's sex, race, and ethnicity. Before completing a Report an employer must give all employees a voluntary opportunity to self-identify. The Department recommends that employers offer a statement about the voluntary nature of this inquiry for employees. For example, the following language may be used:

"The employer is subject to New Jersey reporting requirements for the administration of civil rights laws and regulations. In order to comply with these requirements, the employer invites employees to voluntarily self-identify their sex, race, and ethnicity. Submission of this information is voluntary and refusal to provide it will not subject you to any adverse treatment. The information obtained may only be used in accordance with the provisions of applicable laws, executive orders, and regulations."

If an employee declines to self-identify his sex, race, or ethnicity, employment records or observer identification may be used. Again, this information must be reported for every employee and cannot be left blank.

Definitions of the sex, race, and ethnicity categories are as follows, and are drawn from the federal government's EEO-1 report.

Sexual Categories

The Department permits a designation of *non-binary* to encompass those employees who do not identify as either male or female.

Racial Categories

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.

Black or African American (Not Hispanic or Latino) — A person having origins in any of the black racial groups of Africa.

Native Hawaiian or Pacific Islander (Not Hispanic or Latino) — A person having origins in any of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Native American 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.

White (Not Hispanic or Latino) — A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

Two or More Races (Not Hispanic or Latino) — All persons who identify with more than one of the above five races.

Ethnicity Categories

Hispanic/Latino — A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.

Non-Hispanic/Latino — A person not of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.

Employee Hours Worked (Qualifying Services and Public Works)

The Equal Pay Act requires the Department to collect the number of hours worked by employees. Employers filing a Report for Public Works should continue the same reporting of hours as currently required by the Prevailing Wage Act.

For employers filing a Report for Qualifying Services, the Department will adopt the reporting requirements in the 2016 rule proposed by the Equal Employment Opportunity Commission at 81 F.R. 45479 (the rule was rescinded in 2017). For employees that are not exempt from the Fair Labor Standards Act (“FLSA”), employers must report the **actual number of hours worked by the employee in that year.**

For employees that are FLSA-exempt, an employer may report the actual number of hours worked by the employee. However, in lieu of reporting the actual hours worked, an employer is permitted to report a proxy of **40 hours per week for full-time exempt employees and 20 hours per week for part-time exempt employees**, multiplied by the number of weeks the individuals were employed during the reporting year.

Pay Bands (Qualifying Services Only)

The Equal Pay Act requires the Department to collect data on the compensation earned by employees, which must be reported in pay bands. Employers filing a Report for Public Works should continue the same pay data reporting as currently required by the Prevailing Wage Act.

For employers filing a Report for Qualifying Services, the Department will adopt the reporting requirements in the 2016 rule proposed by the Equal Employment Opportunity Commission at 81 F.R. 45479 (the rule was rescinded in 2017). The Department has adopted the 12 pay bands proposed in the 2016 rule. **An employer should determine an employee’s pay using Box 1 of the employee’s W-2 form, and then sort the employee into one of the 12 pay bands accordingly.**



WILLIAM
PATERSON
UNIVERSITY

PURCHASING OFFICE

P.O. BOX 913 • WAYNE, NEW JERSEY 07474-0913

973.720.2101 FAX 973.720.2872

WWW.WPUNJ.EDU

DIANE B. ALLEN EQUAL PAY ACT

Pursuant to N.J.S.A. 34:11-56.14, a contractor performing “qualifying services” or “public work” to the State or any agency or instrumentality of the State shall provide the Commissioner of Labor and Workforce Development a report regarding the compensation and hours worked by employees categorized by gender, race, ethnicity, and job category.

For more information see <https://nj.gov/labor/equalpay/equalpay.html>.

Firms receiving a contract award issued by the University must complete the applicable report and submit the report to the State of New Jersey as indicated on the form. Do not send completed reports to the University.

Related Documents

- Instructions for Completing the Reports
- Payroll Certification for Public Works Projects Form MW-562
- Annual Equal Pay Report for Qualifying Services Form MW-563

Payroll Certification for Public Works Projects
for Contractor and Subcontractor’s Weekly and Final Certification

Name of <input type="checkbox"/> Contractor or <input type="checkbox"/> Subcontractor			Business Address		Project Name	
Payroll No.			Date Wages Due & Paid		Contract I.D. or Project I.D.	
Week Ending Date			Project Location		Contractor Registration #	
or <input type="checkbox"/> Final Certification						

SUBMIT form by
email: equalpayact@dol.nj.gov

IMPORTANT: For purposes of law,
you must *also* submit this form to
the appropriate public body or lessor.

1. Employee Name and Address	2. Work		3. Demographics			Straight Time or Overtime	4. Day and Date							5. Total Hours	6. Hourly Rate of Pay	7.		8.						9. Net Wages Paid for Week	10. Total Fringe Benefit Cost/Hour	
	Job Title <i>e.g., apprentice, journeyman, foreman</i>	Work Classification/ Occupational Category <i>e.g., carpenter, mason, plumber</i>	Sex <i>M=Male F=Female X=Non-Binary</i>	Race <i>See Key</i>	Ethnicity <i>H= Hispanic N= Non-Hispanic</i>		SU	MO	TU	WE	TH	FR	SA			Gross Amt. Earned		Deductions								
							mm/dd	mm/dd	mm/dd	mm/dd	mm/dd	mm/dd	mm/dd			This Project	This Week	FICA	Withholding Tax							Total Deductions
							Hours worked each day																			
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KEY **W**= White; **B**= Black or African American;
A= Asian; **N**= American Indian or Native Alaskan;
I = Native Hawaiian or Pacific Islander; **M**= 2 or More



State of New Jersey

DEPARTMENT OF THE TREASURY
DIVISION OF TAXATION
P.O. BOX 269
TRENTON, NJ 08695

William Paterson University
PO Box 913
Wayne, NJ 07474-0913

Note: this letter is not dated and has NO expiration.

Sellers: *this letter is not required for audits/ proof of exemption.* See details below.*

Dear Sellers/Vendors and Government Purchasing Officers:

The above-named entity is an agency, political subdivision or instrumentality of the State of New Jersey and is exempt from sales and use taxes, pursuant to Section 9 (a)(1) of the New Jersey Sales and Use Tax Act (N.J.S.A. 54:32B-1 et seq.). An exempt organization certificate (ST-5) or number is not required for the above-named entity to make tax exempt purchases. **Your official letterhead, purchase order or similar document signed by a qualified officer is sufficient proof for your sellers (vendors) that you are exempt from paying New Jersey sales tax.** Payment must be made by check, voucher or electronic payment from a government fund. (Your purchases of natural gas, electricity or their related transportation or transmission services, however, are not exempt. See N.J.S.A. 54:32B-9(c)(3).)

New Jersey state or local governmental entities making **cash purchases of \$150 or less** from imprest funds may use the Exempt Use Certificate, Form ST-4 (except for purchasing room occupancies.) They must complete the Form as follows: (1) a qualified officer of the agency must sign the form; (2) in the box (upper right side) for TAXPAYER REGISTRATION NUMBER, insert "Government Entity;" and (3) in the box for the "N.J.S.A." citation, insert "9(a)." The name and position of the person dealing with the seller should be given at the bottom of the ST-4 certificate. Form ST-4 may be downloaded at: http://www.state.nj.us/treasury/taxation/pdf/other_forms/sales/st4.pdf

Exempt Organization Unit
Regulatory Services Branch
New Jersey Division of Taxation

*See also Bulletin S&U-4 (Sales Tax Guide), "Sales to Government Agencies," p. 26-27, at: <http://www.state.nj.us/treasury/taxation/pdf/pubs/sales/su4.pdf>.

The information contained in this letter is specific to the facts or circumstances presented by the inquirer and may not be relied on by any other person or used as advice or precedent for any other matter or person in a similar situation.

Prohibited Russia-Belarus Activities & Iran Investment Activities

Person or Entity

Part 1: Certification

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

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

<https://www.nj.gov/treasury/administration/pdf/RussiaBelarusEntityList.pdf>

www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf.

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

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

If a vendor or contractor is found to be in violation of law, action may be taken as appropriate and as may be provided by law, rule, or contract, including but not limited to imposing sanctions, seeking compliance, recovering damages, declaring the party in default, and seeking debarment or suspension of the party.

CONTRACT AWARDS AND RENEWALS



I certify, pursuant to law, that neither the person or entity listed above, nor any parent entity, subsidiary, or affiliate appears on the N.J. Department of Treasury's lists of entities engaged in prohibited activities in Russia or Belarus pursuant to P.L. 2022, c. 3 or in investment activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. (Skip Part 2 and sign and complete the Certification below.)

CONTRACT AMENDMENTS AND EXTENSIONS



I certify, pursuant to law, that neither the person or entity listed above, nor any parent entity, subsidiary, or affiliate is listed on the N.J. Department of the Treasury's lists of entities determined to be engaged in prohibited activities in Russia or Belarus pursuant to P.L. 2022, c. 3. I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. (Skip Part 2 and sign and complete the Certification below.)

IF UNABLE TO CERTIFY



I am unable to certify as above because the person or entity and/or a parent entity, subsidiary, or affiliate is listed on the Department's Russia-Belarus list and/or Chapter 25 Iran list. I will provide a detailed, accurate, and precise description of the activities as directed in Part 2 below, and sign and complete the Certification below. Failure to provide such will prevent the award of the contract to the person or entity, and appropriate penalties, fines, and/or sanctions will be assessed as provided by law.

Part 2: Additional Information

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

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

Part 3: Certification of True and Complete Information

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

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

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

Full Name (Print)		Title	
Signature		Date	

AFFIDAVIT OF RELEASE OF LIENS AND INDEMNIFICATION

(This form shall be submitted with the release of
liens as provided by the Architect)

STATE OF _____)

: ss:

COUNTY OF _____)

_____ being duly sworn, according to law,
deposes and says that he is a duly authorized representative of the Contractor,

_____ .

I hereby aver that the Contractor has obtained appropriate releases of liens from all subcontractors and materials suppliers in connection with this Contract. To the best of my knowledge and information, the releases include all labor and materials for which a lien could be filed. The Contractor agrees to defend, indemnify and hold harmless the Owner, its officers, agents, servants and employees from and against any claims of, or by Contractor's laborers, subcontractors and/or material suppliers seeking the payment of money for labor, materials, equipment or services furnished to the Project, including reasonable attorney's fees, arising out of and/or in connection with, the Project, regardless of whether or not they have perfected a mechanics' lien with the Owner. In the event any such claims are brought against the Owner in connection with the Project, the Owner agrees to tender its defense and Contractor agrees to accept the Owner's tender and to defend, indemnify and hold harmless the Owner. If necessary to enforce the provisions herein, upon the Owner's authorization, the Owner's counsel shall execute and deliver a Substitution of Attorney on behalf of the Owner to Contractor's counsel. This agreement shall survive the completion of the project and the termination of the agreement between the Owner and the Contractor.

Signature

Sworn to before me this _____
day of _____, 20____.

Notary Public of _____
My Commission expires ____/____/____.

FORM OF MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as
Principal and _____ as Surety, are held and
firmly bound unto the _____ School District, as Owner, in the amount of ONE
HUNDRED PERCENT (100%) OF THE CONTRACT SUM.

(\$ _____)
(100% of the Contract)

for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our
heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas, the Principal did on
_____, _____, 20____, enter into a Contract for:

ADDITION & RENOVATION TO THE WILLIAM PATERSON FIELDHOUSE

FOR THE

_____ **School District**
[ADDRESS]

WHICH said Contract is made a part of this Bond as though set forth herein: NOW, if the said Principal
shall remedy without cost to the Owner any defects which may develop during a period of two (2) years
from the date established in the Final Application for Payment for the work performed under the said
Contract, provided such defects, in the judgment of the Owner are caused by defective or inferior
materials or workmanship.

The said Surety hereby stipulates and agrees that no modification, deletions or additions in or to the
terms of the said Contract or the Drawings or Project Manual therefore shall in any way affect its
obligation on this Bond.

IN WITNESS WHEREOF, the said Principal and Surety have duly executed this bond under seal this
_____ day of _____, 20____.

ATTEST:

(Principal) Secretary
(SEAL)

(Principal)

ATTEST:

(Surety) Secretary
(SEAL)

(Surety)

STATE OF NEW JERSEY DEBARRED LIST AFFIDAVIT

STATE OF _____)

ss:

COUNTY OF _____)

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

I am _____ an officer of the firm of _____
_____, the bidder making the Proposal for the above name work, and that I executed the same Proposal with full authority to do so; that said bidder at the time of making of this bid is not included on the State of New Jersey, State Treasurer's or any State or Federal Government's List of Debarred, Suspended and Disqualified Bidders; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with the full knowledge that the _____, as the Owner relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for said work.

The undersigned further warrants that should the name of the firm making this bid appear on the State Treasurer's or any State or Federal Government's List of Debarred, Suspended and Disqualified Bidders at any time prior to, and during the life of this Contract, including Guarantee Period, that the Local Unit shall be immediately so notified by the signatory of this Eligibility Affidavit.

The undersigned understands that the firm making the bid as Contractor is subject to debarment, suspension and/or disqualification in contracting with the State of New Jersey, if the Contractor commits any of the acts warranting debarment, suspension or disqualification as determined according to applicable law and regulation.

Subscribed and sworn to before
me this ____ day of _____, 20__.

Notary Public of _____
My Commission expires ____/____/20__.

SAMPLE FORM
STATE OF NEW JERSEY

DIVISION OF CONTRACT COMPLIANCE

EQUAL EMPLOYMENT OPPORTUNITY IN PUBLIC CONTRACTS

INITIAL PROJECT WORKFORCE REPORT CONSTRUCTION

Official Use Only

Assignment

Code

READ INSTRUCTIONS ON THE BACK CAREFULLY BEFORE THE COMPLETION AND DISTRIBUTION OF THIS FORM.
PLEASE TYPE OR PRINT IN BLACK OR BLUE INK.

1. FID NUMBER	2. CONTRACTOR ID NUMBER	5. NAME AND ADDRESS OF PUBLIC AGENCY AWARDED CONTRACT	
3. NAME AND ADDRESS OF PRIME CONTRACTOR		CONTRACT NUMBER DATE OF AWARD DOLLAR AMOUNT OF AWARD	
(Name)			
(Street Address)			
(City) (State) (Zip Code)		6. NAME AND ADDRESS OF PROJECT	7. PROJECT NUMBER
4. IS THIS COMPANY MINORITY OWNED [] OR WOMAN OWNED []		COUNTY	8. IS THIS PROJECT COVERED BY A PROJECT LABOR AGREEMENT (PLA)? <input type="checkbox"/> YES <input type="checkbox"/> NO

9. TRADE OR CRAFT	PROJECTED TOTAL EMPLOYEES				PROJECTED MINORITY EMPLOYEES				PROJECTED PHASE - IN DATE	PROJECTED COMPLETION DATE
	MALE		FEMALE		MALE		FEMALE			
	J	AP	J	AP	J	AP	J	AP		
1. ASBESTOS WORKER										
2. BRICKLAYER OR MASON										
3. CARPENTER										
4. ELECTRICIAN										
5. GLAZIER										
6. HVAC MECHANIC										
7. IRONWORKER										
8. OPERATING ENGINEER										
9. PAINTER										
10. PLUMBER										
11. ROOFER										
12. SHEET METAL WORKER										
13. SPRINKLER FITTER										
14. STEAMFITTER										
15. SURVEYOR										
16. TILER										
17. TRUCK DRIVER										
18. LABORER										
19. OTHER										
20. OTHER										

I hereby certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements are willfully false, I am subject to punishment.

(Signature)

10. (Please Print Your Name)

(Title)

(Area Code)

(Telephone Number)

(Ext.)

(Date)

EXHIBIT B

P.L. 1975 C. 127 (N.J.A.C. 17:27)

**MANDATORY AFFIRMATIVE ACTION LANGUAGE
CONSTRUCTION CONTRACTS**

During the performance of this contract, the Contractor and subcontractor agrees as follows:

- A. The Contractor or Subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Except with respect to affectional or sexual orientation, the Contractor will take affirmative action to ensure that applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this non-discrimination clause.
- B. The Contractor or Subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex.
- C. The Contractor or Subcontractor, where applicable, will send to each labor union or representative of workers with which it has a collective bargaining Agreement or other Contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the Contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. The Contractor or Subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to P.L. 1975, c. 127, as amended and supplemented from time to time.
- E. When hiring workers in each construction trade, the Contractor or Subcontractor agrees to attempt in good faith to employ minority and female workers in each construction trade consistent with the applicable employment goal prescribed by N.J.A.C. 17:27 -7.3; Section 7.3; provided however, that the Affirmative Action Office may, in its discretion, exempt a Contractor or Subcontractor from compliance with the good faith procedures prescribed by the following provisions (A), (B) and (C), as long as the Affirmative Action Office is satisfied that the Contractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Affirmative Action Office, that its percentage of active "card carrying" members who are minority and female workers is equal to or greater than the applicable employment goal prescribed by N.J.A.C. 17:27 - 7.3, promulgated by the Treasurer to P.L. 1975, c. 127 as amended and supplemented from time to time. The Contractor or Subcontractor agrees that a good faith effort shall include compliance with the following procedure:
 - (A). If the Contractor or Subcontractor has a referral agreement or arrangement with a union for a construction trade, the Contractor or Subcontractor shall, within three (3) days of the Contract Award, seek assurances from the union that it will cooperate with the Contractor or Subcontractor as it fulfills its affirmative action obligations under this Contract and in accordance with the rules promulgated by the Treasurer pursuant to P.L. 1975, c. 127, as supplemented and amended from time to time. If the Contractor or Subcontractor is

unable to obtain said assurances from the construction trade union at least five (5) days prior to the commencement of Construction Work, the Contractor or Subcontractor agrees to attempt to hire minority and female workers directly, consistent with the applicable employment goal. If the Contractor's or Subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances indicates a significant possibility that the trade union will not refer sufficient minority and female workers consistent with the applicable employment goal, the Contractor or Subcontractor agrees to be prepared directly to hire minority workers, consistent with the applicable employment goal, by complying with the following hiring procedures prescribed under (B) below; and the Contractor or Subcontractor further agrees to immediately take said action if it determines or is so notified by the Affirmative Action Office that the union is not referring minority and female workers consistent with the applicable employment goal.

- (B). If the hiring of a work force consistent with the employment goal has not or cannot be achieved for each construction trade by adhering to the procedures of (A) above, or if the Contractor does not have a referral agreement or arrangement with a union for a construction trade, the Contractor or Subcontractor agrees to take the following actions consistent with the applicable County employment goals:
1. To notify the Public Agency Compliance Officer, Affirmative Action Office and at least one approved minority referral organization of its manpower needs, and request referral of minority and female workers;
 2. To notify any minority and female workers who have been listed with it as awaiting available vacancies;
 3. Prior to Commencement of Work, to request the local construction trade union, if the Contractor or Subcontractor has a referral agreement or arrangement with a union for the construction trade, to refer minority and female workers to fill job openings;
 4. To leave standing requests for additional referral to minority and female workers with the local construction trade union, if the Contractor or Subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area until such time as the work force is consistent with the employment goal;
 5. If it is necessary to lay off some of the workers in a given trade on the construction site, to assure, consistent with the applicable State and Federal Statutes and court decisions, that sufficient minority and female employees remain on the site consistent with the employment goal; and to employ any minority and female workers so laid off by the Contractor or any other construction site in the area on which its workforce composition is not consistent with an employment goal established pursuant to rules implementing P.L. 1975, c. 127;
 6. To adhere to the following procedure when minority and female workers apply or are referred to the Contractor or Subcontractor:
 - (i) If said individuals have never previously received any document or certification signifying a level of qualification lower than required, the Contractor or Subcontractor shall determine the qualifications of such individuals and if the Contractor's work force in each construction trade is not consistent with the applicable employment goal, it shall employ such

persons which satisfy appropriate qualification standards; provided however, that a Contractor or Subcontractor shall determine that the individual at least possesses the skills and experience classification determination which may have been made by a Public Agency Compliance Officer, union, apprentice program or a referral agency, provided the referral agency is acceptable to the Affirmative Action Office and provided further that, if necessary, the Contractor or Subcontractor shall hire minority and female workers who qualify as trainees pursuant to these regulations. All of these requirements, however, are limited by the provisions of (C) below.

- (ii) If the Contractor's or Subcontractor's workforce is consistent with the applicable employment goal, the name of said female or minority group individual shall be maintained on a waiting list for the first consideration, in the event the Contractor's or Subcontractor's work force is no longer consistent with the applicable employment goal.
- (iii) If for any reason said Contractor or Subcontractor determines said minority individual or a female is not qualified or if said individual qualifies as an advance trainee or apprentice, the Contractor or Subcontractor shall inform the individual in writing with the reasons for the determination, maintain a copy in its files, and send a copy to the Public Agency Compliance Officer and to the Affirmative Action Office.

- 7. To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the Contract, on forms made available by the Affirmative Action Office and submitted promptly to that office upon request.

- (C). The Contractor or Subcontractor agrees that nothing contained in the preceding provisions (B) shall preclude the Contractor or Subcontractor from complying with the hiring hall or apprenticeship provisions in any applicable collective bargaining agreement or hiring hall arrangement and where required by custom or agreement, it shall send journeyman and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement; provided however, that where the practices of a union or apprenticeship program will result in the exclusion of minorities and females or the failure to refer minorities and females consistent with county employment goal, the Contractor or Subcontractor shall consider for employment persons referred pursuant to said provision (B) without regard to such agreement or arrangement; provided further, however, that the Contractor or Subcontractor shall not be required to employ female and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees as a percentage of the total work force for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also the Contractor or Subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and female workers residing within the geographical jurisdiction of the union.

- F. The Contractor agrees to complete an initial Project Manning Report on forms provided by the Affirmative Action Office or in the form prescribed by the Affirmative Action Office and submit a copy of said form no later than three (3) days after signing a Construction Contract; provided, however, the public agency may extend in a particular case the allowable time for submitting the form to no more than fourteen (14) days; and to submit a copy of the Monthly Project Manning Report once a month (by the seventh (7) work day of each month) thereafter for the duration of this Contract to the Affirmative Action Office and to the Public Agency Compliance Officer. The

Contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and off-the-job programs for outreach and training of minority and female trainees employed on the construction projects.

- G. The Contractor and its Subcontractors shall furnish such reports or other documents to the Affirmative Action Office as may be requested by the Office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Affirmative Action Office for conducting a compliance investigation pursuant to Subchapter 10 of the Administrative Code (NJAC 17:27.1 et. seq.).

All successful construction Contractors must submit the following form of evidence:

Completed form AA-201 "Initial Project Manning Report - Construction"

The completed form AA-201 should be submitted at the time the signed contract is returned to the Board of Trustees. The Form AA-201 must be submitted by the third (3rd) calendar day after the signing of the construction contract. If the construction Contractor does not submit Form AA-201 within the required time period, the Board of Trustees **may** extend the time period to the fourteenth (14th) calendar day. If by the fourteenth (14th) calendar day the contractor does not submit the form, the Board of Trustees **must declare the contractor is non-responsive and award the contract to the next lowest responsible bidder.**

Affirmative Action Acknowledgement
For Compliance with Affirmative Action Regulations

Sworn and subscribed to before me

This ____ Day of _____, 20____.

By: _____
Signature of Principal

(Name)

Notary Public of

(Title)

My commission expires: _____, 20____.

CERTIFICATION AS TO BIDDER OWNERSHIP, LEASING OR CONTROL OF EQUIPMENT

(Reference: Instruction To Bidders, Page 2, Paragraph C)

Certification 1:

I, _____, certify that I own, lease, or control all of the necessary equipment required by the plans, specifications and advertisements under which bids are asked for.

Certification 2a:

I, _____, certify that I do not own, lease or control all of the necessary equipment required by the plans, specifications and advertisements under which bids are asked for. The equipment will be obtained from the following source(s):

Attached hereto is a certificate from the person(s) in control of said equipment granting me control of the equipment required during such time as may be necessary for the completion of that portion of the contract for which it is necessary.

Certification 2b:

I, _____, certify that I am in control of the equipment to be used by _____, as required by his contract with the Addition and Renovations to the William Paterson Fieldhouse @ William Paterson University. _____ is granted control of the equipment during such time as may be necessary for the completion of that portion of the contract for which it is necessary.

Corporate Name of Bidder

Address

Telephone Number

Signature of Authorized Agent

1

E. Prevailing Wage

If applicable, the Bidder has complied and will continue to comply with the New Jersey Contractor Registration Act, Public Laws 1999, Chapter 238, and the New Jersey Prevailing Wage Act, Laws of 1963, Chapter 150, and all amendments thereto, with respect to the School Facilities Project and any contracts related to school construction entered into on behalf of the School Board, the SDA or the State, except those contracts not within the contemplation of these acts. The Bidder shall not hire any Subcontractors to perform any work on the School Facilities Project who is listed or is on record in the Office of the Commissioner, Department of Labor, as having failed to pay prevailing wages in accordance with the provisions of the New Jersey Prevailing Wage Act.

F. Certificate of Authority to Perform Work in New Jersey

A current, valid Certificate of Authority to Perform Work in New Jersey has been issued by the State Department of the Treasury (N.J.S.A. 18A:7G-37). A copy of the Certificate is attached to this Certification.

G. Business Registration Certificate

A current, valid Business Registration Certificate pursuant to P.L. 2004, C.57, has been issued by the New Jersey Department of Treasury, Division of Revenue. A copy of the Certificate is attached to this Certification.

H. Trade License

A current, valid contractor or trade license required under applicable New Jersey Law for any trade or specialty area in which this form seeks to perform work is attached to this Certification.

I. Prequalification

The Bidder certifies that the Bidder and the Subcontractor in the four branches listed in N.J.S.A. 18A:18A-18 are prequalified by the SDA pursuant to N.J.S.A. 18A:7G-33 et seq. and that, since the latest prequalification application was filed by the Bidder with the SDA at the time of this bid submittal, the amount of the bid proposal and the value of all outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit, there has been no change in any circumstance, condition or status that may adversely impact Bidder's prequalification with the SDA. The Bidder certifies that it will immediately report to the SDA any change in the information provided by the Bidder in its prequalification application currently on file with the SDA.

The Bidder certifies that it will immediately notify the SDA and the Unit of Fiscal Integrity (PO Box 063, Trenton, New Jersey 08625) of any director, partner, officer, or employee of the Bidder, or of any shareholder owning 5% or more of the Bidder's stock, who:

1. Is the subject of investigation involving any violation of criminal law or other federal, state, or local law or regulation by any governmental agency; or
2. Is arrested, indicted or named as an unindicted co-conspirator in any indictment or other accusatory instrument; or
3. Is convicted of any crime under state or federal law, or of any disorderly persons offense or misdemeanor involving a business related offense.

J. Quality Control

During the term of this project, the contractor will have in place a suitable quality control and quality insurance program and an appropriate safety and health plan.

K. Debarment

The Bidder certifies that it is not included on the State Treasurer's, the EDA's, the SDA's or the Federal Government's List of Debarred, Suspended or Disqualified Bidders as a result of action taken by the State or Federal Agency. If awarded the contract, the Bidder acknowledges and agrees to insert into all contracts with all Subcontractors and Subconsultants a clause stating that the Bidder, its Subcontractors or Subconsultants may be debarred, suspended or disqualified from contracting and/or working on the School Facilities Project if found to have committed any of the acts listed in N.J.A.C. 17:19-3.1 et seq. or 6:20-7.1 et seq. or any applicable regulation issued by or affecting the SDA.

The Bidder certifies that it shall immediately notify the Owner, in writing, in the event the Bidder or any Subcontractor or Subconsultant appears on the Treasury's, the EDA's, the SDA's or the Federal Government's List of Debarred, Suspended or Disqualified Bidders.

II. The undersigned hereby consents to the following:

A. Consent to Documents

If awarded the contract, the Bidder agrees and hereby consents to permit the SDA, the Department of Education, the Department of Community Affairs, other State agencies, the Unit of Fiscal Integrity, and their respective agents, representatives, consultants, subconsultants, contractors, subcontractors, and their agents and representatives (the "Project Team") access to ALL DOCUMENTS RELATED TO THE CONTRACT, including, but not limited to, the following:

1. Prequalifying information and work product.
2. All confidential memos and certifications required to be kept by any governmental agency, including, but not limited to, the Department of Community Affairs, the Department of Labor, the Department of Education, the Department of Environmental Protection, the Department of Treasury, the Division of Consumer Affairs, Licensing Boards, and the SDA.
3. All documents required to be kept by the Contract, including, but not limited to, contracts, specifications, change orders, alternate submissions, approvals/rejections, unit prices, product data, time of performance schedules, construction photographs, quality control management and reports, value engineering information, up-to-date project accounting system, intermediate and final audits, as-builts, close-out documentation.
4. All documents related to the approval process for the School Facilities Project, including, but not limited to, project siting, land acquisition, surveys, and real estate documents (deeds, leases, and title report, including searches for easements, mortgages, judgments, liens, unpaid taxes, water & sewer, and property description by metes & bounds).
5. All documents related to the payment, in connection with the Contract, of professionals, including but not limited to surveyors, title abstractor/company, lawyers, appraisers, soils engineers, bond counsel, underwriters, financial and investment advisors, trustees, official printers, bond insurers.

- B. Right to Inspect and Audit. The Bidder agrees to allow the Project Team upon request, at all reasonable times, to inspect and copy any and all of the above-described documents to the extent such documents are in its possession, custody or subject to its control. The Bidder agrees to make the requested documents available for inspection and copying within the State of New Jersey regardless of the location of the documents. The Bidder hereby waives any objection it might otherwise raise permitting the Project Team, including the Unit of Fiscal Integrity and its authorized representatives to investigate, examine and inspect all activities related to this contract pursuant to Public Law 2000, Chapter 72, '70. The Bidder further releases and holds harmless the Unit of Fiscal Integrity and its authorized representatives, the EDA, the SDA and the State of New Jersey.

All statements contained in the Bidder's bid/proposal and this Certification are true and correct: and all such statements have been made with full knowledge that the EDA, the SDA and the State of New Jersey rely upon the truth of the statements contained in this Certification in providing payments to the School Board for the School Facilities Project pursuant to the Agreement.

Sworn and subscribed to before me

This ___ Day of _____ 20____

By: _____
Signature of Principal

Notary Public of

(Name)

My commission expires: _____, 20____.

(Title)

EXHIBIT E-2

Form of Contractor Certification and Consent

CONTRACTOR CERTIFICATION AND CONSENT
UPON AWARD OF CONTRACT

This certification should be completed by the Contractors engaged by the District for the School Facilities Project. This certification should be completed upon award by the District of the Construction Contract. If the District is undertaking multiple School Facilities Projects, this certification should be completed for each School Facilities Project.

School District: _____

County: _____

Project Name: _____

DOE Project Number: _____

STATE OF NEW JERSEY:

SS:

COUNTY OF _____:

I, _____, of the City of _____, in the County of _____ and the State of New Jersey of full age, being duly sworn according to law on my oath, depose and say that I am the _____ of the firm of _____, (the "Contractor") for the above-referenced School Facilities Project (the "School Facilities Project"). My firm has entered into a contract with the District (the "District") for the School Facilities Project with full authority to do so. Terms not otherwise defined herein shall have their meaning as set forth in such Agreement.

I. The undersigned hereby swears and affirms to the following:

A. No Gratuities

The Contractor has not offered or tendered, directly or indirectly, the payment of any fee, commission or compensation of any kind or the granting of any gift or gratuity of any kind, whether in connection with the purchase, sale, or contract, to any person in the employ of the District, the SDA, the EDA or the State of New Jersey (the "State") having any duties or responsibilities in connection with the purchase or acquisition of any property or services by the District, the SDA, the EDA or State, by or on behalf of any seller, supplier or provider of services, who has made, negotiated, solicited or offered to make any contract to sell or furnish real or personal property or services to the District, the SDA, the EDA or the State. I further understand that it is a violation of law to offer, pay, or give to any employee of the District, the SDA, the EDA or the State any fees, commission, compensation, gift or gratuity for or because of any official act or any violation of any official duty. Any person who does so may be subject to punishment.

B. No Collusion

The Contractor has not directly or indirectly entered into any agreement, participated in any collusion, bid rigging or otherwise taken any action in restraint of free, competitive bidding in connection with the School Facilities Project; the prices in the bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition; the prices have not been knowingly disclosed directly or indirectly by the Contractor to any other bidder, unless otherwise required by law; and no attempt has been made by the Contractor to induce any other person or business entity to submit or not submit a bid for the purpose of restricting competition.

C. No Discrimination

The Contractor will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, gender or sexual orientation and has complied and will continue to comply with all State and Federal laws and Executive Orders respecting non-discrimination.

D. Prevailing Wage

If applicable, the Contractor has complied and will continue to comply with the New Jersey Contractor Registration Act, Public Laws 1999, Chapter 238, and the New Jersey Prevailing Wage Act, Laws of 1963, Chapter 150, and all amendments thereto, with respect to the School Facilities Project and any contracts related to school construction entered into on behalf of the District, the SDA or the State, except those contracts not within the contemplation of these acts. The Contractor shall not hire any Subcontractors to perform any work on the School Facilities Project who is listed or is on record in the Office of the Commissioner, Department of Labor, as having failed to pay prevailing wages in accordance with the provisions of the New Jersey Prevailing Wage Act.

E. Prequalification

The Contractor certifies that the Contractor and the Subcontractors in the four branches listed in N.J.S.A. 18A:18A-18 are prequalified by the SDA and that, since the latest prequalification application was filed by the Contractor with the SDA, there has been no change in any circumstance, condition or status that may adversely impact Contractor's prequalification with the SDA. The Contractor certifies that it will immediately report to the SDA any change in the information provided by the Contractor in its prequalification application currently on file with the SDA.

The Contractor certifies that it will immediately notify the SDA and the Unit of Fiscal Integrity (P.O. Box 063, Trenton, NJ 08625) of any director, partner, officer, or employee of the Contractor, or of any shareholder owning 5% or more of the Contractor's stock, who:

1. Is the subject of investigation involving any violation of criminal law or other federal, state, or local law or regulation by any governmental agency; or
2. Is arrested, indicted or named as an unindicted co-conspirator in any indictment or other accusatory instrument; or
3. Is convicted of any crime under state or federal law, or of any disorderly persons offense or misdemeanor involving a business related offense.

II. The undersigned hereby consents to the following:

A. Consent to Documents

The Contractor agrees and hereby consents to permit the SDA, the Department of Education, the Department of Community Affairs, other State agencies, the Unit of Fiscal Integrity and their respective agents, representative, consultants, subconsultants, contractors, subcontractors, and their agents and representatives (the "Project Team") access to ALL DOCUMENTS RELATED TO THE CONTRACT including, but not limited to, the following:

1. Prequalifying information and work product.
2. All confidential memos and certifications required to be kept by any governmental agency,

including, but not limited to, the Department of Community Affairs, the Department of Labor, the Department of Education, the Department of Environmental Protection, the Department of Treasury, the Division of Consumer Affairs, Licensing Boards, and the SDA.

3. All documents required to be kept by the Contract, including, but not limited to, contracts, specifications, change orders, alternate submissions, approvals/rejections, unit prices, product data, time of performance schedules, construction photographs, quality control management and reports, value engineering information, up-to-date project accounting system, intermediate and final audits, as-builts, close-out documentation.
4. All documents related to the approval process for the School Facilities Project, including, but not limited to, project siting, land acquisition, surveys, and real estate documents (deeds, leases and title report, including searches for easements, mortgages, judgments, liens, unpaid taxes, water & sewer, and property description by metes & bounds).
5. All documents related to the payment, in connection with the Contract, of professionals, including but not limited to surveyors, title abstractor/company, lawyers, appraisers, soils engineers, bond counsel, underwriters, financial and investment advisors, trustees, official printers, bond insurers.

B. Right to Inspect and Audit

The Contractor agrees to allow the Project Team upon request, at all reasonable times, to inspect and copy any and all of the above-described documents to the extent such documents are in its possession, custody or subject to its control. The Consultant agrees to make the requested documents available for inspection and copying within the State of New Jersey regardless of the location of the documents. The Contractor hereby waives any objection it might otherwise raise permitting the Project Team, including the Unit of Fiscal Integrity and its authorized representatives to investigate, examine and inspect all activities related to this contract pursuant to Public Law 2000, Chapter 72,70. The Contractor further releases and holds harmless the Unit of Fiscal Integrity and its authorized representatives, the SDA, the EDA and the State of New Jersey.

All statements contained in the Contractor's bid/proposal and this Certification and Consent are true and correct, and all such statements have been made with full knowledge that the SDA, the EDA and the State of New Jersey rely upon the truth of the statements contained in this Certification and Consent in providing payments to the District for the School Facilities Project pursuant to the Agreement.

By: _____
Signature of Principal

(Name) _____

(Title) _____

Sworn and subscribed to before me
This _____ day of _____, 20__

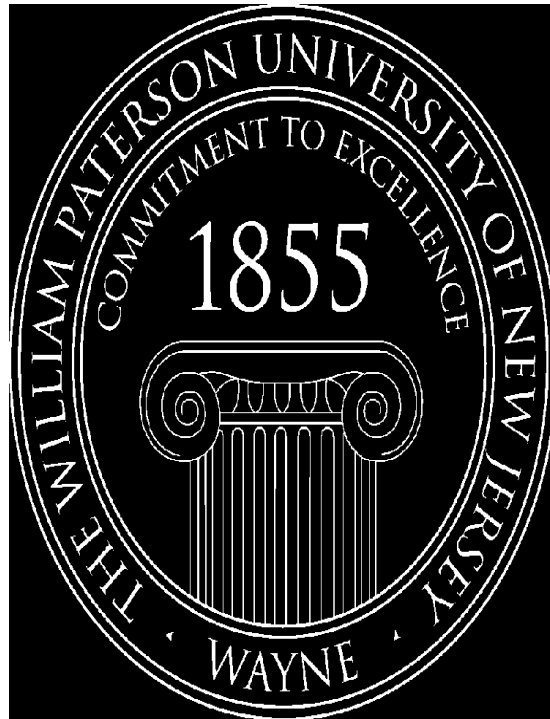
Notary Public of _____

My commission expires: _____, 20__

*The William Paterson University
Of New Jersey
Wayne, New Jersey*

Office of the Vice President for Administration and Finance

CONSTRUCTION CONTRACT
with



*Company Name
of
Town, State*

Project Title
(WP-xx-xx-xx)

MMDDYY

**The William Paterson University of New Jersey
Wayne, New Jersey
Office of the Vice President for Administration and Finance**

CONSTRUCTION CONTRACT

This Contract is entered into and dated this xxth day of MM, YY between The William Paterson University of New Jersey, hereinafter called the "Owner", and Contractor's Name, hereinafter called the "Contractor".

WITNESS THAT:

The parties hereto agree as follows:

**Article 1
EMPLOYMENT OF THE CONTRACTOR**

1.1 For and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Owner, the Contractor hereby agrees with the Owner to commence and complete the construction described in Paragraph 1.2.

1.2 **Scope of Work:** All work is to be completed as follows:

Furnish all labor, equipment, and materials required to complete all work for this project as specified in the Contract Documents, including those prepared by the architectural firm of Architect's Name, and as submitted in the Bid Form submitted on MMDDYY.

Contract Documents include:

1. This Contract
2. Supplemental Instructions for Bidding and Bid Form
3. Addendum No.
4. Forms Submitted by the Contractor with Bid
5. General Conditions
6. Instruction to Bidders
7. Plans & Specs issued by Architect's Name.

The Scope of Work outlined above shall hereinafter be called the "Project".

1.3 Time for Completion: All work is to be completed by not later than MMDDYY.

The contractor's equipment location will be determined by the University.

Work can be performed on weekends and after regular work hours, with the written approval of the University.

1.4 Bonus(s) and Penalty(s): Liquidated damages shall be \$1,000.00 per calendar day.

Article 2

CONTRACTOR'S COMPENSATION

2.1 The Owner shall pay the Contractor as full compensation for all the services required as listed below, or in connection with this Contract, a total fee of: \$0000000.

Article 3

PAYMENTS

3.1 The Contract sum is stated in the Contract and, including authorized adjustments thereto, is in the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents.

3.2 The Owner agrees to pay the Contractor in current funds for the performance of the Contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account hereof as provided in Article 10 "Payment", of the General Conditions.

Article 4
PROGRESS REQUISITIONS AND PAYMENTS

4.1 The Contractor shall submit his Application for Payment to the Architect. The Architect will review the Application and make his recommendation to the Owner for payment. The Contractor shall submit an Application for Payment no more than once per month. If the Architect does not recommend approval of the Application for Payment as submitted, he will immediately advise the Contractor. If agreement cannot be reached within five (5) days, the Application for Payment, together with the Architect's recommendation, will be sent to the Owner for its decision and appropriate action. Alternately, the dispute may be submitted to a process of alternative dispute resolution. The Owner will make payment within thirty (30) days after final determination of amount due or otherwise in accordance with Prompt Payment Act, N.J.S.A. 2A:30A-2 and Article 10 of the General Conditions.

4.2 Recommendations for approval of an Application for Payment will constitute a representation by the Architect to the Owner, based on his or her inspections at the site and data contained in the Requisition for Payment, that the Work has progressed to the point indicated; that, to the best of his or her knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents; and that the Contractor is entitled to payment in the amount certified. By recommending approval of requisition for payment, however, the Architect shall not thereby be deemed to represent that he or she has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, or reviewed the construction means, methods, techniques, sequences or procedures, or any examination to ascertain how and for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

4.3 Unless otherwise provided in the Contract Documents, payments may be made on account of materials or equipment not incorporated in the Work, but delivered and suitably stored on the site.

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

4.5 In addition to other warranties required by provisions of the Contract and Specifications, the Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner, either upon incorporation into the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances. This provision shall not be construed as relieving the Contractor from 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 by the Owner of its right to require fulfillment of all terms of the Contract.

Article 5

PROGRESS PAYMENTS BY CONTRACTORS TO SUBCONTRACTORS

5.1 Neither the Owner nor the Architect has any obligation to pay or see to the payment of any monies to any Subcontractor except as may otherwise be required by law. The Contractor shall certify in the Application for Payment that payments to all Subcontractors and suppliers are consistent with the level of payments made by the Owner to the Contractor and the Prompt Payment Act N.J.S.A. 2A:30A-2, which governs payments to contractors and subcontractors. If the Contractor has not, in fact, made such payments, he has made a fraudulent statement and is subject to legal action on

the part of the Owner including withholding payments on subsequent Applications for Payment in amounts reasonably necessary for payment of claims or potential claims of Subcontractors and/or suppliers.

Article 6

PAYMENTS WITHHELD

6.1 The Owner or the Architect may decline to certify payment and may withhold the Contractor's Application for Payment in whole or in part, to the extent necessary to protect the Owner. If the Owner or the Architect and the Contractor cannot agree on a revised amount, the Owner will promptly approve for payment that amount which he believes the Contractor to be entitled. The Owner may also decline to certify payment or, because of subsequently discovered evidence or subsequent inspections, may reevaluate the whole or any part of any Application for Payment previously issued, to such extent as may be necessary to protect the Owner. In those instances where the Contractor, the Owner and/or the Architect are in disagreement, the matter shall be referred to the University Contracting Office for resolution. Upon the written request of the Contractor, the Contracting Officer shall determine the appropriate amount to be paid to the Contractor consistent with the interests of the Owner. Additionally, consistent with the Prompt Payment Act, disputes regarding whether a party has failed to make payments required, may be submitted to a process of alternative dispute resolution.

Article 7

FINAL PAYMENT-CERTIFICATION OF FINAL COMPLETION

7.1 The acceptance by the Contractor of Final Payment shall be and operate as a release to the Owner of all claims and liability to the Contractor for all things done or furnished in connection with this Work, and for every act, omission or neglect of the Owner relating to or arising out of this Work. No payment, however, final or otherwise, shall operate to release the

Contractor or his Sureties from any obligations under the Contract Documents or the Performance and Payment Bonds.

7.2 If, for any reason, the Contractor refuses final payment, the Project will be closed out by the Owner unilaterally without processing a Final Acceptance Certificate. All residual funds will be held in escrow by the Owner until all claims of the Owner and all Contractors are satisfied.

Article 8

ABANDONMENT OR POSTPONEMENT OF PROJECT

8.1 The Owner shall have the right to defer the beginning or to suspend the whole or any part of the work herein contracted to be done, whenever, in the opinion of the Contracting Officer, it may be necessary or expedient for the Owner to do so. If the Contractor is delayed in the completion of the work by act, neglect, default of the Architect, or of any other party employed by the University upon the work, by changes ordered in the work, by strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties, by any cause beyond the Contractor's control or by these or any other cause which the Contracting Officer shall decide to justify the delay, then for all such delays and suspensions the Contractor shall be allowed one day additional to the time herein stated for each and every day of such delays so caused in the completion of the work. The same is to be determined by the Contracting Officer for similar allowances of extra time to be made for such other delays the Contracting Officer may determine to have been caused by the University. For those delays caused by the acts, neglect or default of the Owner, , the Contractor shall be entitled to an upward adjustment in the contract price to compensate the Contractor for eligible costs defined by Article 14 of the General Conditions. For all other delays, the Contractor shall not be entitled to extra compensation or damage from the University other than an extension of time. The contractor shall not be entitled to any damages or extra compensation from the University on account of any act, neglect or default by the Architect or any other party employed by the University.

8.2 The Contractor shall comply with the provisions of N.J.S.A. 52:33-1et seq., which requires that only domestic materials be acquired or used unless the Contracting Officer finds it is impracticable to make such requirement or that it would unreasonably increase the cost.

Article 9

ADJUSTMENT OF CONTRACT COMPLETION TIME

9.1 The Contract completion time or times will be adjusted only for causes specified in the contract documents. In the event a Contractor requests an extension of any Contract Completion Date, it shall furnish such justification and supporting evidence that the University requires to evaluate the Contractor's request. The University shall then make his finding of fact and advise the Contractor in writing thereof. If the University finds that the Contractor is entitled to any extension of any Contract Completion Date under the provisions of this Contract, the determination as to the total number of days extension shall be based upon the currently approved schedule and on all data relevant to the extension.

Article 10

CORRECTION OF WORK

10.1 The Contractor shall promptly correct all Work rejected by the Owner or the Architect as defective or as failing to conform to the Contract Documents, whether observed before or after Final Acceptance and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including the Architect's additional services, if any.

10.2 The Contractor shall remove from the Site all portions of the Work which are defective or nonconforming and which have not been corrected unless removal is waived by the Owner.

10.3 If the Contractor fails to correct defective or non-conforming Work in a timely manner, the Owner may make arrangements for such correction by others and charge the cost of so doing to the responsible Contractor and/or his Sureties.

10.4 If the Contractor does not proceed with the correction of such defective or nonconforming work within a reasonable time, fixed by written notice from the Owner of the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay for the cost of such removal and storage within ten (10) days thereafter, the Owner may upon ten (10) days additional written notice sell such material and equipment at auction or private sale and shall account for the net proceeds thereof, after deducting all of the costs which are the responsibility of the Contractor including compensation for the Architect's additional services, if any. If such proceeds of sale do not cover all costs which the Contractor and an appropriate credit Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor and/or his Surety will pay the difference to the Owner.

10.5 The Contractor shall also be responsible for the cost of making good all Work destroyed or damaged by such correction or removal.

10.6 Nothing contained herein shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Document.

Article 11
DEFECTIVE OR NONCONFORMING WORK & DELAYS

11.1 If the Contracting Officer determines that the best interests of the University will be served by accepting defective or nonconforming work, he may do so instead of requiring its removal and correction. In such instance, a Credit Change Order will be issued to reflect an appropriate and equitable reduction in the Contract Sum. Such adjustment shall be effected regardless of Final Payment having been previously made, and the Contractor and/or his surety shall be responsible for promptly providing any funds due the University as a result thereof.

Article 12
CHANGES IN THE WORK

12.1 A Change Order is a written order to the Contractor, signed by the Owner and the Architect, issued after execution of the Contract, authorizing a Change in the Work, or an adjustment in the Contract Sum, or the Contract time. The Contract Sum and the Contract Time may be altered only by a Change Order. A Change Order signed by the Contractor and the Owner indicates an agreement which shall serve to adjust the Contract Sum and/or the Contract Time. A Change Order shall become a part of the Contract Documents only after it is fully executed by the Contractor and the Owner. Changes in the work shall otherwise be governed by Article 14 of the General Conditions, which is incorporated herein by reference.

Article 13
INSURANCE

13.1 Contractor Insurance Requirements

13.1.1 The Contractor shall secure and maintain in force for the term of the Contract, insurance coverage provided herein. All insurance coverage is subject to the approval of the University and shall be issued by an insurance company authorized to do business in the State of New Jersey and which maintains an A.M. Best rating of A- (VII) or better.

The Contractor shall provide the University with current Certificates of Insurance for all coverage and renewals thereof which must contain the provision that the insurance provided in the certificate shall not be canceled for any reason except after thirty (30) days written notice to the University. All insurance required herein shall contain a waiver of subrogation in favor of the University. All insurance required herein, except Workers' Compensation and Owners and Contractors Protective, shall name William Paterson University, the State of New Jersey, the New Jersey Educational Facilities Authority, the William Paterson University Board of Trustees, the Architect/Engineer and Construction Manager as additional insureds.

13.1.2 Commercial General Liability insurance written on an occurrence form including independent contractor liability, products/completed operations liability, contractual liability, covering but not limited to the liability assumed under the indemnification provisions of this contract. Coverage for bodily injury and property damage claims arising out of the professional acts of the general contractor and subcontractors shall also be included. The policy shall not include any endorsement that restricts or reduces coverage as provided by the ISO CG0001 form without the approval of the University. The minimum limits of liability shall not be less than a combined single limit of one million dollars (\$1,000,000) per occurrence, two million dollars (\$2,000,000) general aggregate, two million dollars (\$2,000,000) product/completed operations aggregate. A "per project endorsement" shall be included, so that the general aggregate limit applies separately to the project that is the subject of this contract.

13.1.3 Comprehensive Automobile Liability covering owned, non-owned, and hired vehicles. The limits of liability shall not be less than a combined single limit of one million dollars (\$1,000,000) per occurrence.

13.1.4 Worker's Compensation Insurance applicable to the laws of the State of New Jersey and other State or Federal jurisdiction required to protect the employees of the Contractor and any Subcontractor who will be engaged in the performance of this Contract. The certificate must so indicate that no proprietor, partner, executive officer or member is excluded. This insurance shall include Employers' Liability Protection with a limit of liability not less than one million dollars (\$1,000,000) bodily injury, each occurrence, one million dollars (\$1,000,000) disease, each employee, and one million dollars (\$1,000,000) disease, aggregate limit. Including the employer's liability insurance under the umbrella insurance can satisfy the limit requirements.

13.1.5 The Contractor shall obtain and maintain a separate Owners and Contractor's Protective Liability Insurance Policy for the same limits of liability as specified for the Commercial General Liability Insurance in the name of William Paterson University, the State of New Jersey, the New Jersey Educational Facilities Authority and the William Paterson University Board of Trustees. The Architect/Engineer, and the Construction Manager are to be named as additional insured. The policy shall be maintained in force for the term of the Project or one year, whichever is longer.

13.1.6 Excess Liability, umbrella insurance form, applying excess of primary to the commercial general liability, commercial automobile liability and employer's liability insurance shall be provided with minimum limits of two million dollars (\$2,000,000) per occurrence, two million dollars (\$2,000,000) general aggregate, and two million dollars (\$2,000,000) products/completed operations.

13.1.7 The contractor shall require all subcontractors to comply with all of the insurance requirements described above. It is a contractor option to determine the amount of excess liability it will require its subcontractors to carry. The contractor shall be responsible for obtaining certificates of

insurance for all coverage and renewals thereof for each subcontractor prior to the subcontractor's beginning work on the project. The contractor shall provide copies of all subcontractor certificates of insurance to the University upon request.

13.2 Insurance To Be Carried By The University

13.2.1 The University shall provide insurance protection in the form of a Builders Risk Insurance or similar Policy upon the structure for which the Work on this Contract is to be done. The structure will be insured for 100% of the insurable replacement value thereof including materials, owned by the University, in place or to be used as part of the permanent construction including surplus materials.

13.2.2 This insurance shall not protect against damage or loss to any of the Contractor's or Subcontractor's tools, equipment, scaffolding, staging towers or forms, Contractor's materials and sheds or other temporary structures erected for used by the Contractor or Subcontractors. It is understood that the Contractor will at their own expense, carry all insurance which may be required to provide the necessary protection against such loss or damage herein described which insurance shall contain a waiver of any right of subrogation against the University.

13.2.3 The insurance procured by the University under this paragraph may provide for a deductible. The Contractor shall assume the responsibility for any deductible for any builder's risk loss it may make claim for under this policy.

13.2.4 The Contractor shall immediately notify the University, in writing and take any other appropriate steps as may be required under the standard Builder's Risk Insurance Policy in effect in the event of any loss. Prior to the acceptance of the building by the University, the Contractor shall, at the University's option, replace and repair the damaged Work as originally provided in the drawings and specifications at no additional compensation to that provided in the original contract.

13.2.5 All losses will be adjusted with, and payable to, the University.

13.2.6 The Contractor shall not include any cost for Builders Risk insurance premiums as described herein. However, this provision shall not relieve the Contractor from their obligation to complete, according to plans and specifications, the project covered by the contract, and the Contractor and their Surety shall be obligated to full performance of the Contractor's undertaking.

ARTICLE 14

DOCUMENTATION RETENTION

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

ARTICLE 15

EQUAL EMPLOYMENT OPPORTUNITY & AFFIRMATIVE ACTION REQUIREMENTS

15.1 Exhibit B (Revised 4/10) is attached hereto and must be signed prior to award.

15.2 Additional Mandatory Construction Contract Language for State Agencies, Independent Authorities, Colleges and Universities:

It is the policy of the [Reporting Agency] that its contracts should create a workforce that reflects the diversity of the State of New Jersey. Therefore, contractors engaged by the [Reporting Agency] to perform under a construction contract shall put forth a good faith effort to engage in recruitment and employment practices that further the goal of fostering equal opportunities to minorities and women.

The contractor must demonstrate to the [Reporting Agency]'s satisfaction that a good faith effort was made to ensure that minorities and women have been afforded equal opportunity to gain employment under the [Reporting Agency]'s contract with the contractor. Payment may be withheld from a contractor's contract for failure to comply with these provisions.

Evidence of a "good faith effort" includes, but is not limited to:

1. The Contractor shall recruit prospective employees through the State Job bank website, managed by the Department of Labor and Workforce Development, available online at <http://NJ.gov/JobCentralNJ>;
2. The Contractor shall keep specific records of its efforts, including records of all individuals interviewed and hired, including the specific numbers of minorities and women;
3. The Contractor shall actively solicit and shall provide the [Reporting Agency] with proof of solicitations for employment, including but not limited to advertisements in general circulation media, professional service publications and electronic media; and
4. The Contractor shall provide evidence of efforts described at 2 above to the [Reporting Agency] no less frequently than once every 12 months.
5. The Contractor shall comply with the requirements set forth at N.J.A.C. 17-27.

To ensure successful implementation of the Executive Order and Law, state agencies, independent authorities and colleges and universities must forward an Initial Project Workforce Report (AA201) for any projects funded with ARRA money to the Dept of LWD, Construction EEO Monitoring Program immediately upon notification of award but prior to execution of the contract.

Article 16
NOTIFICATION

16.1 Written notices required under this Contract shall be validly and sufficiently served by the University upon the Contractor if addressed and mailed to the Contractor at:

Representative
Title
Contractor
Address
Telephone: Fax:
E-Mail:

Written notices from the Contractor to the University should be mailed by Certified Mail to:

Kevin Garvey
Associate Vice President Administration
The William Paterson University of New Jersey
300 Pompton Road
Wayne, New Jersey 07470
Telephone: 973-720-2861; Fax: 973-720-2829
E-Mail: garveyk@wpunj.edu

Article 17
HAZARDOUS MATERIALS CONTRACTOR PROVIDED

17.1 Any Contractor or Subcontractor that brings or has delivered to a construction site on the University's campus, for a period of more than eight (8) hours, any hazardous chemicals, solvents, paints, etc., must supply the University or Construction Manager with a copy of that product's Material Safety Data Sheet (MSDS) upon its approval to the construction site. This is required by the State of New Jersey Department of Health's Right To Know Program. The law states that University employees and community residents

are entitled to know this information, should there be an occasion to become aware of or exposed to a chemical hazard at the construction site on the University's campus.

17.2 Any Contractor or Subcontractor who brings a hazardous chemical substance or product to the construction site on the University's campus, and that substance or product is marked "TRADE SECRET", then the University's request is that a substitute product be used, because the Contractor or Subcontractor will not be able to obtain the MSDS information that the University will need.

17.3 The University will not permit the delivery of any hazardous chemical material shipments to this campus that has not been properly identified and labeled.

Article 18

PRE-EXISTING HAZARDOUS MATERIALS - PROJECT SITE

18.1 Unless specifically identified in the Contract Documents, the Contractor has no responsibility for the handling or removal of any pre-existing hazardous materials in any form at the project site. This includes, but is not limited to asbestos, PCBs or other toxic substances. If in the process of performing services under this contract, if the Contractor or Subcontractor encounters materials that are believed to be hazardous, the University shall be notified immediately.

Article 19

Warranty Commissioning and Brokering

By executing this agreement, the Contractor warrants, in accordance with N.J.S.A. 18A:64-6.1, that no person or selling agency has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. If the Contractor

breaches or violates this warranty, the University shall have the right to terminate this Contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage or contingent fee.

Article 20

PREVAILING WAGE AND REGULATIONS

20.1 The Contractor acknowledges and affirms that he has personal knowledge of or has obtained and reviewed a copy of the valid prevailing wage rates for all trades involved in the project, the geographic location of the project, as issued by the commissioner of the Department of Labor and Workforce Development, Trenton, New Jersey.

20.2 The Contractor and subcontractors shall submit to the University a certified payroll record on each project. Such record shall be submitted each payroll period within ten (10) days of the payment of wages.

20.3 The Contractor and Subcontractors shall keep an accurate record showing the name, craft or trade, and actual hourly rate of wages paid to each employee employed by said Contractor in connection with said project and shall be preserved for two years from date of payment.

20.4 Contractors and Subcontractors performing work under this contract shall post the prevailing wage rates for each craft or trade and classification involved as determined by the commissioner, including the effective date of any changes thereof, in prominent and easily accessible places at the site of the work or at such place or places as are used then to pay the employees of the Contractor and Subcontractor their wages.

20.5 Nothing in the Contract, however, shall prohibit the payment of more than the prevailing wage rate to any employee of the Contractor and Subcontractor assigned to this project.

20.6 In the event that it is found that any worker, employed by the Contractor or any Subcontractor covered by said Contract, has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the University may terminate the Contractor's or Subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The Contractor and his sureties shall be liable to the University for any excess costs occasioned thereby.

Article 21

CONTRACT TERMS, CHANGES AND SUCCESSORS

21.1 This written instrument along with the documents specified in Article 1.2 constitutes the entire Contract between the Owner and the Contractor.

21.1.a In case of any conflict or ambiguity, the provisions of this Contract Document shall prevail over any rider except as to any provisions in the basic Contract Document which are expressly, by reference, modified by a rider incorporated into the contract. The terms and conditions of this contract may not be modified or changed except in writing signed by the Contractor and the Owner. This Contract shall be binding upon the heirs, representatives and successors of the Contractor.

21.1.b If any clause or provision is found to be illegal, unconscionable or unenforceable, that clause or provision shall be considered deleted from this Contract Document and all the other clauses and provisions shall remain in effect and binding as if the clause or provision deleted had never been a part of this Contract Document.

Article 22

Executive Order 189

22.1.a No vendor shall pay, offer to pay, or agree to pay, either directly or indirectly, any fee, commission, compensation, gift, gratuity, or other thing of value of any kind to any State officer or employee or special State officer or

employee, as defined by N.J.S.A. 52:13D-13b. and e., in the Department of the Treasury or any other agency with which such vendor transacts or offers or proposes to transact business, or to any member of the immediate family, as defined by N.J.S.A. 52:13D-13i., of any such officer or employee, or any partnership, firm, or corporation with which they are employed or associated, or in which such officer or employee has an interest within the meaning of N.J.S.A. 52:13D-13g.

22.1.b. The solicitation of any fee, commission, compensation, gift, gratuity or other thing of value by any State officer or employee or special State officer or employee from any State vendor shall be reported in writing forthwith by the vendor to the Attorney General and the Executive Commission on Ethical Standards.

22.1.c. No vendor may, directly or indirectly, undertake any private business, commercial or entrepreneurial relationship with, whether or not pursuant to employment, contract or other agreement, express or implied, or sell any interest in such vendor to, any State officer or employee or special State officer or employee having any duties or responsibilities in connection with the purchase, acquisition or sale of any property or services by or to any State agency or any instrumentality thereof, or with any person, firm or entity with which he is employed or associated or in which he has an interest within the meaning of N.J.S.A. 52:13D-13g. Any relationships subject to this provision shall be reported in writing forthwith to the Executive Commission on Ethical Standards, which may grant a waiver of this restriction upon application of the State officer or employee or special State officer or employee upon a finding that the present or proposed relationship does not present the potential, actuality or appearance of a conflict of interest.

22.1.d. No vendor shall influence, or attempt to influence or cause to be influenced, any State officer or employee or special State officer or employee in his official capacity in any manner which might tend to impair the objectivity or independence of judgment of said officer or employee.

22.1.e. No vendor shall cause or influence, or attempt to cause or

influence, any State officer or employee or special State officer or employee to use, or attempt to use, his official position to secure unwarranted privileges or advantages for the vendor or any other person.

22.1.f. The provisions cited above in paragraph 3a. through 3e. shall not be construed to prohibit a State officer or employee or special State officer or employee from receiving gifts from or contracting with vendors under the same terms and conditions as are offered or made available to members of the general public subject to any guidelines the Executive Commission on Ethical Standards may promulgate under paragraph 3c.

IN WITNESS WHEREOF, the parties to these presents have executed this Contract in three (3) counterparts, each of which shall be deemed an original, on this xxth day of MMYYY.

William Paterson University of NJ - (Owner)

BY:_____

Samantha Green

Associate Vice President, Finance & Controller

William Paterson University of New Jersey

ATTEST:_____

Kevin Garvey

Associate Vice President for Administration

William Paterson University of New Jersey

_____ - (Contractor)

BY:_____

Print Name:

Title:

Contractor:

ATTEST:_____

Print Name:

Title:

Contractor:

(REVISED 4/10)

EXHIBIT B

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE

N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127)

N.J.A.C. 17:27-1.1 et seq.

CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers

EXHIBIT B (Cont)

provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active “card carrying” members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

EXHIBIT B *(Cont)*

- (4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
- (5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
- (6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
 - (i) The contractor or subcontractor shall interview the referred minority or women worker.
 - (ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.
 - (iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.
 - (iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.
- (7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

EXHIBIT B (Cont)

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.

COMPANY: _____

SIGNATURE: _____

PRINT NAME: _____

TITLE: _____

DATE: _____

Additional Mandatory Construction Contract Language for State Agencies, Independent Authorities, Colleges and Universities Only

The Executive order No. 151 (Corzine, August 28, 2009) and P.L. 2009, Chapter 335 include a provision which require all state agencies, independent authorities and colleges and universities to include additional mandatory equal employment and affirmative action language in its construction contracts. It is important to note that this language is in addition to and does not replace the mandatory contract language and good faith efforts requirements for construction contracts required by N.J.A.C. 17:27-3.6, 3.7 and 3.8, also known as Exhibit B. The additional mandatory equal employment and affirmative action language is as follows:

It is the policy of the **William Paterson University of New Jersey** that its contracts should create a workforce that reflects the diversity of the State of New Jersey. Therefore, contractors engaged by the **William Paterson University of New Jersey** to perform under a construction contract shall put forth a good faith effort to engage in recruitment and employment practices that further the goal of fostering equal opportunities to minorities and women.

The contractor must demonstrate to the **William Paterson University of New Jersey's** satisfaction that a good faith effort was made to ensure that minorities and women have been afforded equal opportunity to gain employment under the **William Paterson University of New Jersey's** contract with the contractor. Payment may be withheld from a contractor's contract for failure to comply with these provisions.

Evidence of a "good faith effort" includes, but is not limited to:

1. The Contractor shall recruit prospective employees through the State Job bank website, managed by the Department of Labor and Workforce Development, available online at <http://NJ.gov/JobCentralNJ>;
2. The Contractor shall keep specific records of its efforts, including records of all individuals interviewed and hired, including the specific numbers of minorities and women;
3. The Contractor shall actively solicit and shall provide the **William Paterson University of New Jersey** with proof of solicitations for employment, including but not limited to advertisements in general circulation media, professional service publications and electronic media; and
4. The Contractor shall provide evidence of efforts described at 2 above to the **William Paterson University of New Jersey** no less frequently than once every 12 months.
5. The Contractor shall comply with the requirements set forth at N.J.A.C. 17:27.

To ensure successful implementation of the Executive Order and Law, state agencies, independent authorities and colleges and universities must forward an Initial Project Workforce Report (AA 201) for any projects funded with ARRA money to the Division of Public Contracts EEO Compliance immediately upon notification of award but prior to execution of the contract.

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Public Agency Instructions

This page provides guidance to public agencies entering into contracts with business entities that are required to file Political Contribution Disclosure forms with the agency. **It is not intended to be provided to contractors.** What follows are instructions on the use of form local units can provide to contractors that are required to disclose political contributions pursuant to N.J.S.A. 19:44A-20.26 (P.L. 2005, c. 271, s.2). Additional information on the process is available in Local Finance Notice 2006-1 (www.nj.gov/dca/lgs/lfnslfnmenu.shtml).

1. The disclosure is required for all contracts in excess of \$17,500 that are **not awarded** pursuant to a “fair and open” process (N.J.S.A. 19:44A-20.7).
2. Due to the potential length of some contractor submissions, the public agency should consider allowing data to be submitted in electronic form (i.e., spreadsheet, pdf file, etc.). Submissions must be kept with the contract documents or in an appropriate computer file and be available for public access. **The form is worded to accept this alternate submission.** The text should be amended if electronic submission will not be allowed.
3. The submission must be **received from the contractor and** on file at least 10 days prior to award of the contract. Resolutions of award should reflect that the disclosure has been received and is on file.
4. The contractor must disclose contributions made to candidate and party committees covering a wide range of public agencies, including all public agencies that have elected officials in the county of the public agency, state legislative positions, and various state entities. The Division of Local Government Services recommends that contractors be provided a list of the affected agencies. This will assist contractors in determining the campaign and political committees of the officials and candidates affected by the disclosure.
 - a. The Division has prepared model disclosure forms for each county. They can be downloaded from the “County PCD Forms” link on the Pay-to-Play web site at www.nj.gov/dca/lgs/p2p. They will be updated from time-to-time as necessary.
 - b. A public agency using these forms **should edit them to properly reflect the correct legislative district(s)**. As the forms are county-based, **they list all legislative districts** in each county. **Districts that do not represent the public agency should be removed from the lists.**
 - c. Some contractors may find it easier to provide a single list that covers all contributions, regardless of the county. These submissions are appropriate and should be accepted.
 - d. The form may be used “as-is”, subject to edits as described herein.
 - e. The “Contractor Instructions” sheet is intended to be provided with the form. It is recommended that the Instructions and the form be printed on the same piece of paper. The form notes that the Instructions are printed on the back of the form; where that is not the case, the text should be edited accordingly.
 - f. The form is a Word document and can be edited to meet local needs, and posted for download on web sites, used as an e-mail attachment, or provided as a printed document.
5. It is recommended that the contractor also complete a “Stockholder Disclosure Certification.” This will assist the local unit in its obligation to ensure that contractor did not make any prohibited contributions to the committees listed on the Business Entity Disclosure Certification in the 12 months prior to the contract. (See Local Finance Notice 2006-7 for additional

information on this obligation) A sample Certification form is part of this package and the instruction to complete it is included in the Contractor Instructions. **NOTE: This section is not applicable to Boards of Education.**

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

Contractor Instructions

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

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

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

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

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

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

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

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

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

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

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

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

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

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

Part I – Vendor Information

Vendor Name:			
Address:			
City:		State:	Zip:

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

Signature

Printed Name

Title

Part II – Contribution Disclosure

Disclosure requirement: Pursuant to N.J.S.A. 19:44A-20.26 this disclosure must include all reportable political contributions (more than \$300 per election cycle) over the 12 months prior to submission to the committees of the government entities listed on the form provided by the local unit.

☐ Check here if disclosure is provided in electronic form.

Contributor Name	Recipient Name	Date	Dollar Amount
			\$

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

Continuation Page

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

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

Page ____ of ____

Vendor Name:

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

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

County Name:

State: Governor, and Legislative Leadership Committees

Legislative District #s:

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

County:

Freeholders

County Clerk

Sheriff

{ County Executive }

Surrogate

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

**USERS SHOULD CREATE THEIR OWN FORM, OR DOWNLOAD
FROM WWW.NJ.GOV/DCA/LGS/P2P A COUNTY-BASED,
CUSTOMIZABLE FORM.**

STOCKHOLDER DISCLOSURE CERTIFICATION

Name of Business:

☐ I certify that the list below contains the names and home addresses of all stockholders holding 10% or more of the issued and outstanding stock of the undersigned.

OR

☐ I certify that no one stockholder owns 10% or more of the issued and outstanding stock of the undersigned.

Check the box that represents the type of business organization:

☐ Partnership

☐ Corporation

☐ Sole Proprietorship

☐ Limited Partnership

☐ Limited Liability Corporation

☐ Limited Liability Partnership

☐ Subchapter S Corporation

Sign and notarize the form below, and, if necessary, complete the stockholder list below.

Stockholders:

Name:	Name:
Home Address:	Home Address:
Name:	Name:
Home Address:	Home Address:
Name:	Name:
Home Address:	Home Address:

Subscribed and sworn before me this ____ day of _____, 2
____.

(Notary Public)

My Commission expires:

(Affiant)

(Print name & title of affiant)

(Corporate Seal)

CERTIFICATION OF NO MATERIAL CHANGE OF CIRCUMSTANCES

Name of Firm: _____
(Printed/Typed)

Address: _____
(Printed/Typed)

(Printed/Typed)

1. A statement as to the financial ability, adequacy of plant equipment, organization and prior experience of the bidder, as required by N.J.S.A. 18A:18A-28 has been submitted to the Department of Treasury within the last six (6) months preceding the date of opening of bids for this contract.
2. I certify, as required by N.J.S.A. 18A: 18A-32 that there has been no material adverse change in the qualification except:

Bidder's Authorized Representative:

Name: _____
(Printed/Typed)

Title: _____
(Printed/Typed)

Signature: _____ Date: _____



Settembrino Architects

25 Bridge Ave. Suite 201
Red Bank, NJ 07701

732.741.4900 (o)
732.741.4977 (f)

RFI REQUEST FORM

Contractor: _____

RFI Number: _____

Address: _____

Request Date: _____

City, State, Zip: _____

Project: _____

Subject: _____

Drawing/Spec Section: _____

Description of Request:

Response:

Answered by: _____

Date: _____

LIST OF DRAWINGS – HOLLAND BROOK ELEMENTARY SCHOOL

**CONTRACT NO. 1: ROOF REPLACEMENT @
HOLLAND BROOK ELEMENTARY SCHOOL
READINGTON TOWNSHIP, NEW JERSEY**

DWG. NO.	TITLE
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T-001	COVER SHEET
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ARCHITECTURAL

A.171	OVERALL ROOF PLAN
A.172	PARTIAL ROOF PLAN & DEMOLITION NOTES
A.173	PARTIAL ROOF PLAN – DEMOLITION
A-173A	EXISTING PHOTOS
A-173B	EXISTING PHOTOS
A-174	PARTIAL ROOF PLAN & NEW WORK NOTES
A-175	PARTIAL ROOF PLAN NEW WORK
A-201	ROOF DETAILS
A-202	ROOF DETAILS

SECTION 01010 - SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY OF WORK

- A. Project Description: Project name is Additions & Renovations to the William Paterson Fieldhouse @ William Paterson University, prepared by Settembrino Architects dated May 19, 2023.
- B. This Section Includes the Following:
 - 1. Legal removal of existing materials indicated to be removed.
 - 2. Installation of new materials as specified.

1.3 INTENT OF THE SPECIFICATIONS

- A. The intent of these specifications is to describe the materials and methods of construction required for the performance of the work. In general, it is intended that the Contract Documents shall delineate the detailed extent of the work.
- B. Before preparing and submitting a bid, it is mandatory that each bidder visit the site to determine the extent of the work. Each bidder shall fully inform itself prior to bidding as to existing conditions and limitations under which this work will be performed and shall include in its bid a sum to cover the cost of all items necessary to perform the work as set forth in the Contract Documents.
 - 1. Protect all existing construction. Damage to existing construction or equipment shall be restored to the satisfaction of the Architect at no additional cost to the Owner.
 - 2. Contractor shall be advised that the Contract for this work shall be awarded by the University prior to July 31, 2023. If said bids are within budgeted amounts, the contract work shall commence on June 19, 2023. All work shall be completed no later than April 1, 2024 with the following work area restrictions:
 - i. Women's locker room area (becoming baseball) – October 26, 2023 – February 10, 2024
 - ii. Baseball locker room area (becoming women's soccer and softball) – October 29, 2023-March 1, 2024
 - iii. Football locker room – November 13, 2023-March 15, 2024
 - iv. Training room (becoming field hockey) – November 13, 2023- March 1, 2024
 - 3. The following work schedule shall be strictly adhered to. Failure to do so shall be cause to immediately terminate the Agreement between Owner and Contractor. It shall be understood by all parties if work is to be performed on weekends and holidays, the Contractor can perform said work only if approved by the Owner before hand. Any costs for custodial staff to be on site during weekends and holidays or outside of their regular work hours shall be the contractor's responsibility.
 - 1) Working hours on Monday through Friday (school open) 4:00 P.M. to 11:00 P.M.

- 2) Working hours on Monday through Friday (school closed) shall be 7:30 A.M. to 5:00 P.M.
- 3) On holidays, Saturdays and Sundays working hours shall be 9:00 A.M. to 3:00 P.M. with prior approval from the Business Administrator.
4. Contractor shall upon completion of the day's work inspect and clean any debris and dust from Classrooms and spaces located in the area of work. Contractor shall provide all necessary precaution to protect existing building and contents during the removal and installation process. The Contractor shall be responsible to remove and replace any item or finishes damaged during the execution of the Work.
5. The contractor shall report any discrepancies between the documents and field conditions to the architect ten (10) days prior to submission of a proposal so that the architect may clarify the discrepancy. Failure to report any discrepancies will nullify any extra cost, once a contract has been awarded.

C. AWARD OF CONTRACT

1. It is the intention of the University to award this contract as soon as possible after receipt of the proposals.
2. Contractor's use of the site is contingent upon his not adversely impacting the quality of education to the students on site and does not affect the safety of the students. It will be the responsibility of the contractor to properly protect the site, and its materials and equipment. Further, no exit ways from the existing school building shall be closed to impede the safe exiting of children, staff and the public from the school building.

D. CONTRACTS

1. The specifications contain forms of proposal for a single overall contract including all the work necessary to provide the University with a complete fully functional, operational elevator with all required certificates of occupancy and best quality of workmanship.

E. KNOWLEDGE OF CONTRACT REQUIREMENTS

1. The contractor and his subcontractors, sub-subcontractors and materialmen shall consult in detail the general conditions, supplementary conditions, all division and sections of the specification, all drawings and all addenda for instructions and requirements pertaining to the work and shall provide all labor, materials, equipment and services necessary to furnish, install and complete the work in strict conformance with all provisions thereof.
2. The contractor will be held to have examined the site of the work prior to submitting its proposal and informed it, its subcontractors, sub-subcontractors and materialmen of all existing conditions affecting the execution of the work.
3. The contractor will be held to have examined the contract documents, and modifications thereto, as they may affect subdivisions of the work and informed it, its subcontractors, sub-subcontractors and materialmen of all conditions thereof affecting the execution of the work.
4. The scope of work for the contract is not necessarily limited to the description of each section of the specifications. Include all minor items not expressly indicated in the contract documents, or as might be found necessary as a result of field conditions, in order to complete the work as it is intended, without any gaps between the various subdivisions of work of the contractors and their subcontractors.
5. The contractor will be held to be thoroughly familiar with all conditions affecting labor in the neighborhood of the project including, but not limited to, Unions, incentive pay, procurement, living and commuting conditions and to have informed its subcontractor and sub-subcontractors thereof.

F. CONTRACT DOCUMENTS INFORMATION

1. The contract documents are prepared in accordance with available information as to existing conditions and locations. If, during construction, conditions are revealed at variance with the contract documents, notify the Architect immediately so that supplementary instructions may be issued.
2. The specifications determine the kinds and methods of installation of the various materials, the drawings establish the quantities, dimensions and details of materials, the schedules on the drawings give the location, type and extent of the material.
3. Should the drawings, specifications or schedules disagree in themselves or with either or both of the others, the better quality or greater quantity of work or materials shall be performed and provided, unless otherwise directed in writing by the Architect.
4. Dimensions given on the drawings govern scale measurements and large-scale drawings govern small-scale drawings, except as to anything omitted unless such omission is expressly noted on the larger scale drawings.
5. Whenever a material, article or piece of equipment is referred to in the singular number in the contract documents, it shall be the same as referring to it in the plural. As many such materials, articles or pieces of equipment shall be provided as are required to complete the work.

G. Contractor Use of Premises: Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public.

1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
2. Keep driveways and entrances clear at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize requirements for storage of materials.

H. Use of the Existing Building: Maintain the existing building in a weather tight condition throughout construction. Repair damage caused by construction operations. Take precautions necessary to protect the building and occupants during the construction period.

I. Full Owner Occupancy: The Owner will occupy the site and existing building during construction. Cooperate with the Owner to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.

J. Partial Owner Occupancy: The Owner reserves the right to occupy and place and install equipment in completed areas prior to Substantial Completion provided such occupancy does not interfere with completion of the Work. Placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. A Certificate of Substantial Completion will be executed for each portion of the Work occupied prior to Owner occupancy.
2. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.

K. It shall be understood that the working hours for this project shall be between the hours indicated above. All classrooms and interior spaces affected by the work shall be swept clean daily and restored to its original condition at the end of each working day.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01010

SECTION 01015- CONTRACTOR'S USE OF PREMISES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section Includes the Following:
 - 1. This Section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors and employees enter upon Owner's property.

1.3 QUALITY ASSURANCE

- A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Owner may require all personnel who will enter upon the Owner's property certify their awareness of and familiarity with requirements of this Section.

1.4 TRANSPORTATION FACILITIES

- A. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach job site. If any damage occurs the contractor is responsible for repairs.
- B. Contractor's vehicles:
 - 1. Require Contractor's vehicles, vehicles belonging to employees of Contractor, and all other vehicles entering upon Owner's property in performance of Work of Contract, to use only the Access Route approved in advance by Owner.
 - 2. Do not permit such vehicles to park on any street or other area of Owner's property except in the area approved by Owner as "Contractor's Parking Area."

1.5 FACILITY USAGE

- A. Provide adequate protection for all interior and exterior portions of the building during set-up and construction. If any damage occurs the contractor is responsible for repairs as designated by the Owner.
- B. Restrooms and other amenities of the building will only be used with permission of the Owner. If such authorization is given, the Contractor is responsible for maintaining cleanliness and repairs as designated by the Owner.

1.6 SECURITY

- A. Restrict access of all persons entering upon the Owner's property to the Access Route and to the actual site of the work.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01015

SECTION 01020 – ALLOWANCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, apply to this Section.

1.2 SUMMARY

- A. Selected materials and equipment, and in some cases, installation are included in Contract Documents by allowances. Allowances are established to defer selection until more information is available. Other requirements will be issued by a Change Order.
- B. Types of allowances required include the following:
 - 1. Lump sum allowances.
 - 2. Contingency allowance.
- C. Procedures for submitting and handling Change Orders are included in Division 1 Section "Modification Procedures."
- D. Selection and Purchase: At the earliest feasible date after Contract award, advise the Architect of the date when selection and purchase of each product or system described by an allowance must be completed to avoid delay.
 - 1. When requested by the Architect, obtain proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of the Work.
 - 2. Purchase products and systems from the designated supplier.
- E. Submittals: Submit proposals for purchase of products or systems included in allowances, in the form of Change Orders.
 - 1. Submit invoices or delivery slips to indicate quantities of materials delivered for use in fulfillment of each allowance.
- F. Contingency and Lump Sum Allowance: Do not include overhead and profit, bonding, insurance and general conditions' costs. These costs shall be included as part of the Contract Sum Base Bid and not part of the Allowance.
 - 1. Allowances shall include costs of specific products and materials ordered under the Allowance, including delivery. Allowances shall include installation costs unless indicated to be included as part of the Contract Sum Base Bid and not part of the Allowance.
 - 2. Use Allowances only as directed by the Architect and only by Change Order, which designates amount(s) to be charged to the Allowance.
 - 3. At Project Closeout, credit unused amounts remaining in the Allowances to the Owner by Change Order.
- G. Unused Materials: Return unused materials for credit to the Owner, after installation has been completed and accepted.

1. If it is not feasible to return unused material, prepare unused material for the Owner's storage, and deliver to the storage space as directed. Otherwise, disposal is the Contractor's responsibility.
- H. Inspection: Inspect products covered by an allowance promptly upon delivery for damage or defects.
- I. Preparation: Coordinate materials and installation for each allowance with related materials and installations to ensure that each allowance item is integrated with related construction activities.
- J. SCHEDULE OF ALLOWANCE
 1. **Contract No. 1 - Allowance No. 1:** The Contractor shall allow the contingency sum of Two Hundred Thousand Dollars (\$200,000.00) to cover unforeseen contingency items, or additional owner requested work.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01020

SECTION 01021 - CONTRACTOR'S SPECIAL RESPONSIBILITIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The Contractor is responsible for the completion of this particular project as shown and specified and is in charge of his project until completion and acceptance and is responsible for the coordination of all work and all trades in his project and for coordination with each other. Contractor shall study the specifications and notify the Architect of any inconsistencies and of any work not done in conformance with the Contract Documents.
- B. Any existing conditions that shows evidence of deterioration or failure, and has not been indicated or specified herein shall be reported immediately to the Architect for his clarification and final determination.
- C. Obtain from the Owner, current State Tax I.D. number to eliminate payment (or obtain rebate) of New Jersey Sales Taxes as applicable to a non-profit organization.
- D. The conditions defined in this section supplement, and where applicable, supersede portions of the General Conditions for application to the specific nature of this project. It in no way relieves the Contractor of his responsibilities as defined and intended in the General Conditions.

1.3 LINES, LEVELS, AND GRADES

- A. Lay out all work and establish all points, lines and levels and assume all responsibility for same.

1.4 STAGING AREAS

- A. Designation of staging areas will be coordinated with the Owner's Representative.

1.5 GUARANTEES

- A. Except as otherwise specified, guarantee all work against defects resulting from use of inferior materials, equipment or workmanship for one year from date of final acceptance of building.

1.6 FURNITURE

- A. Furniture stored by Owner shall be relocated by Owner.

1.8 BUILDING SECURITY

- A. Contractor shall be responsible during this period for the security of the portions of the building being renovated and entrances being used by construction crews.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01021

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Schedules: The Contractor's start-up and completion dates are specified in Division 1 Section "Summary of Work."

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment Forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of allowances.
 - e. Schedule of alternates.
 - f. List of products.
 - g. List of principal suppliers and fabricators.
 - h. Schedule of submittals.
 - 2. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.
 - 3. Subschedules: Where Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each unit of material and class of labor required for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name and address of owner.
 - c. Contract number.
 - d. Name and address of the Architect.
 - e. Architect's project number.
 - f. Contractor's name and address.

- g. Date of submittal.
2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of work by material, quantity and labor classification.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.
6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
8. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values.
9. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
10. Include separate line items for Project Closeout & Punchlist in the amount of 3% of the total contract.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment-Application Times: The date for each progress payment is the 30th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 30 days prior to the date for each progress payment.
- C. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.

- D. Payment-Application Forms: Use forms provided by the Owner for Applications for Payment.
- E. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the previous pay period.
- F. Transmittal: Submit 5 signed and notarized original copies of each Application for Payment to the Architect by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments, when required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.
 - 1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit final or full waivers.
 - 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
 - a. Submit final Applications for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 5. Waiver Forms: Use AIA Document G706A as the form for Release of Liens.
- H. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:
 - 1. List of subcontractors.
 - 2. List of principal suppliers and fabricators.
 - 3. Schedule of Values.
 - 4. Contractor's Construction Schedule.
 - 5. Schedule of principal products.
 - 6. Schedule of unit prices.
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of building permits.
 - 10. Copies of authorizations and licenses from governing authorities for performance of the Work.
 - 11. Initial progress report.
 - 12. Report of preconstruction meeting.
 - 13. Certificates of insurance and insurance policies.
 - 14. Performance and payment bonds.
 - 15. Data needed to acquire the Owner's insurance.
- I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Meter readings.
 - f. Startup performance reports.
 - g. Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - h. Final cleaning.
 - i. Application for reduction of retainage and consent of surety.
 - j. Advice on shifting insurance coverages.
 - k. Final progress photographs.
 - l. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Ensure that unsettled claims will be settled.
 4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 5. Transmittal of required Project construction records to the Owner.
 6. Certified property survey.
 7. Proof that taxes, fees, and similar obligations were paid.
 8. Removal of temporary facilities and services.
 9. Removal of surplus materials, rubbish, and similar elements.
 10. Completion of training necessary for the Owners personnel to operate all systems trouble-free.
 11. Execution of maintenance agreements and assurance that maintenance is on-going.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 01035 - MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 GENERAL

- A. General: This section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Minor Changes in the Work: Supplemental instructions authorizing minor changes in the Work, not involving adjustment to Contract Sum or Time, will be issued by the Architect on AIA form G710.
- C. Change Order Proposal Requests: Proposal requests that require adjustment to the Contract Sum or Time, if accepted, will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specification. Proposal requests are for information only and shall not be considered as instruction to stop work in progress, or to execute the change.
 - 1. Unless otherwise indicated, within twenty calendar days of receipt, submit an estimate of cost to execute the change.
 - a. Include a list of quantities of products to be purchased and unit costs, along with the amount of purchases to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract time.
- D. Contractor Initiated Change Order Proposal Requests: When unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request to the Architect.
 - 1. Include a statement outlining reasons for the change. Provide a complete description of the change. Indicate effect of the proposed change on the Contract Sum and Time.
 - 2. Include a list of quantities of products to be purchased and unit costs, along with amount of purchases to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Comply with requirements in Section "Product Substitutions" if the change requires substitution of one product or system for product or system specified.
- E. Proposal Request Form: Use AIA Document G 709.
- F. Allowance Adjustment: Base each change order proposal request for an allowance cost adjustment on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place, with reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins.
 - 1. Include installation costs in the purchase amount only where indicated as part of the allowance.
 - 2. When requested, prepare explanations and documentation to substantiate margins claimed.

3. Submit substantiation of a change in scope of work claimed in the change orders related to unit-cost allowances.
 4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure or count.
- G. Submit claims for increased costs because of change in scope or nature of the allowance described in contract documents, whether for purchase amount or Contractor's handling, labor, installation, overhead and profit, within twenty calendar days of receipt of change order or construction change directive authorizing work to proceed. Claims submitted later than twenty calendar days will be rejected.
1. Change order cost amount shall not include Contractor's or subcontractor's indirect expense except when clearly demonstrated that the nature or scope of work required was changed from what could have been foreseen from the allowance description and other information in contract documents.
 2. No change to the Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems, of the same scope and nature as originally indicated.
- H. Construction Change Directive: When the Owner and Contractor are not in agreement on terms of a Change Order Proposal Request, the Architect may issue Construction Change Directive on AIA Form G714, instructing the Contractor to proceed with a change, for subsequent inclusion in a Change Order.
1. Construction Change Directive will contain a complete description of the change and designate method to be followed to determine change in the Contract Sum or Time.
- I. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of the change submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- J. Change Order Procedures: Upon the Owner's approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the Conditions of the Contract.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01035

SECTION 01040 – PROJECT COORDINATION – SINGLE PRIME CONTRACTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations on the Project to be fulfilled by the General Contractor including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. The Contractor shall participate in all coordination requirements.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
 - 2. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
 - 3. Division 1 Section "Materials and Equipment" for coordinating general installation.
 - 4. Division 1 Section "Project Closeout" for coordinating contract closeout.

1.3 COORDINATION

- A. Coordination: **The Contractor shall coordinate its construction activities with his own sub contractors and other entities involved to assure efficient and orderly installation of each part of the Work.**
 - 1. The Contractor shall schedule its construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Where availability of space is limited, the Contractor shall coordinate installation of different components with sub contractors to assure maximum accessibility for required maintenance, service, and repair.
 - 3. The Contractor shall make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their Work is required.

- C. Administrative Procedures: **The Contractor shall coordinate scheduling and timing of its required administrative procedures with other construction activities and activities of sub contractors to avoid conflicts and assure orderly progress of the Work.** Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.
- D. Conservation: The Contractor shall coordinate construction activities to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.
- E. The Contractor shall be responsible for its own cutting and patching, ceiling and wall removal and replacement, etc. to allow for the installation of its own work.

1.4 SUBMITTALS

- A. Coordination Drawings: **The Contractor shall prepare and submit coordination drawings based on appropriate information from each Sub Contractor, where close and careful coordination is required for installation of products and materials fabricated off site by separate entities, and where limited space for efficient installation of different components.**
1. Indicate relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
- B. Staff Names: Within 15 days of commencement of construction operations, the Contractor shall submit a list of its principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
1. Post copies of the list in an approved location.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: The Contractor shall inspect the conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that they are more stringent than requirements in Contract Documents.
- C. Inspect material immediately upon delivery and again prior to installation. Reject damaged and defective items.

- D. Provide attachment and connection devices and methods necessary for securing each construction element.
- E. Coordinate temporary enclosures with inspections and tests, to minimize uncovering completed construction for that purpose.
- F. Mounting Heights: Where mounting heights are not indicated, install components at standard heights for the application indicated. Refer questionable decisions to the Architect.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Limiting Exposures: The contractor shall supervise its construction operations and those of its sub-contractors to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 01040

SECTION 01045 - CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required, submit a proposal describing these procedures before proceeding. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it will be performed.
 - 2. List products to be used and firms or entities that will perform Work.
 - 3. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 - 4. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the structural elements.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
 - 1. Engage an experienced firm or entity to cut and patch the exposed Work.

1.5 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any existing warranties.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size

- required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 4. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. "Indicated" refers to graphic representations, notes, or schedules on Drawings; Paragraphs or Schedules in Specifications; and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference.
2. "Directed," Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.
3. "Approve," used in conjunction with action on submittals, applications, and requests, is limited to the Architect's duties and responsibilities stated in General and Supplementary Conditions.
4. "Regulation" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
5. "Furnish" means "supply and deliver, ready for unloading, unpacking, assembly, installation, and similar operations."
6. "Install" describes operations at the site including "unloading, unpacking, assembly, erection, anchoring, applying, working to dimension, protecting, cleaning, and similar operations."
7. "Provide" means "furnish and install, complete and ready for use."
8. "Installer:" "Installer" is the Contractor or an entity engaged by the Contractor as employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - a. The term "experienced" when used with "Installer" means having a minimum of 5 previous Projects similar in size to this Project and being familiar with the precautions required and with requirements of the authority having jurisdiction.
9. "Project Site" is the space available for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.
10. "Testing Laboratories:" A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

- B. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.

- C. Language used in the Specifications is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the context so indicates.

1. Imperative language is used generally. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 2. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.
- D. Abbreviations and Names: Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.
- E. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents; correspondence and records established in conjunction with compliance with standards; and regulations bearing upon performance of the Work.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01095

SECTION 01200 - PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 PRECONSTRUCTION CONFERENCE

- A. The preconstruction conference will be scheduled within 5 working days after the Owner has issued the Notice to Proceed, but prior to actual start of the Work.
- B. Attendance: Architect, representative of Owner and contractor.
- C. Minimum agenda: Data will be distributed and discussed on the following:
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and the Project Manager.
 - 2. Channels and procedures for communication.
 - 3. Review set-up area.
 - 4. Review all required permits.
 - 5. Review insurance requirements.
 - 6. Construction schedule, including sequence of critical work.
 - 7. Contract Documents.
 - 8. Processing of Shop Drawings and other data submitted to the Project Manager for review.
 - 9. Processing of field decisions and Change Orders.
 - 10. Rules and regulations governing performance of the work.
 - 11. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

1.3 PROGRESS MEETINGS

- A. Progress meetings will be scheduled by the Owner's representative weekly or as described at the pre-bid meeting.
- B. Attendance: Architect, Owner's representative, Contractor and Job Superintendent.
- C. Review of work progress.
 - 1. Review of work progress.
 - 2. Field observations, problems, and decisions.
 - 3. Identification of problems which impede planned progress.
 - 4. Maintenance of progress schedule.
 - 5. Corrective measures to regain projected schedules.
 - 6. Planned progress during succeeding work period.
 - 7. Coordination of projected progress.
 - 8. Maintenance of quality and work standards.
 - 9. Effect of proposed changes on progress, schedule, and coordination.
 - 10. Other business relating to work.

1.4 PRE-FINAL INSPECTION

- A. The Contractor must inform the Architect and the building Owner's representative upon completion of the work. Pre-final inspection will then be scheduled.
- B. Installations or details noted as deficient during inspection must be repaired and corrected by the contractor.
- C. Once corrections have been made, the Contractor must inform the Architect and building Owner's representative so a final inspection can be scheduled.

1.5 FINAL INSPECTION

- A. Scheduled by contractor upon completion of deficient items found during pre-final inspection.
- B. Attendance: Architect, Owner's representative and contractor.
- C. Minimum Agenda:
 - 1. Walk-through inspection.
 - 2. Identification of needed corrections to be completed by the Contractor with final approval from warrantor.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01200

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies requirements for handling submittals.
- B. General Procedures: Coordinate submittal preparation with performance of construction activities, and with purchasing or fabrication, delivery, other submittals and related activities. Transmit in advance of performance of related activities to avoid delay.
 - 1. Coordinate transmittal of different submittals for related elements so processing will not be delayed by the need to review concurrently for coordination. The Architect reserves the right to withhold action on a submittal requiring coordination until related submittals are received.
 - 2. Processing: Allow **two weeks** for initial review. Allow more time if processing must be delayed for coordination with other submittals. The Architect will advise the Contractor when a submittal must be delayed for coordination. Allow two weeks for reprocessing each submittal.
 - a. No extension of time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.
 - 3. Submittal Preparation: Place a label or title block on each submittal for identification. Provide a 4" x 5" space on the label or beside the title block on Shop Drawings to record Contractor's review and approval markings and action taken. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - 4. Submittal Transmittal: Package submittals appropriately for transmittal and handling. Transmit with the transmittal form attached to the end of this section. Submittals received from other than the Contractor will be returned without action.
 - a. Transmittal Form: On the form record requests for data, and deviations from Contract Documents. Include Contractor's certification that information complies with Contract Documents
- C. (not used)
- D. Submittal Schedule: Submit the Submittal Schedule within 10 days of the Construction Schedule. Coordinate the Schedule with the list of subcontracts, Schedule of Values and list of products as well as the Construction Schedule.

1. Prepare the Schedule in chronological order; include submittals required during construction. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Name of subcontractor.
 - d. Description of the construction element covered.
 - e. Scheduled date the Architect's final release or approval.
- E. Distribution of Schedules: Distribute copies of the Construction and Submittal Schedules to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the temporary field office. When revisions are made, distribute to the same parties and post in the same locations.
 1. Updating: Revise each Schedule after each meeting or activity, where revisions have been made. Issue the updated Schedules concurrently with report of each meeting.
- F. Daily Construction Reports: Prepare a daily construction report, recording information concerning events at the site. Submit duplicate copies to the Architect and Owner's representative at weekly intervals. Include the following information:
 1. List of subcontractors at the site.
 2. High and low temperatures, general weather conditions.
 3. Accidents, stoppages, delays, shortages, losses.
 4. Emergency procedures.
 5. Change Orders received, implemented.
 6. Partial Completions, occupancies.
 7. Substantial Completions authorized.
- G. Shop Drawings: Submit new information, drawn to accurate scale. Indicate deviations from Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Include the following information:
 1. Dimensions.
 2. Identification of products and materials included.
 3. Notation of coordination requirements.
 4. Notation of dimensions established by field measurement.
 5. Sheet Size: Except for templates, patterns and similar full- size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 30" x 42".
 6. Initial Submittal: Submit one correctable translucent print and two blue-line print to the Architect for review; with copy of the transmittal to the Construction Manager, the reproducible print will be returned.
 7. Final Submittal: Submit 3 blue-line prints; if the Drawing is required for maintenance manuals submit 5 prints. 2 prints will be retained; the remainder will be returned. One of the prints returned shall be maintained as a "Record Document".
 8. Do not use Shop Drawings without a final stamp indicating action taken in connection with construction.
 9. The Contractor shall issue copies of returned submittals to its subcontractors.
- H. Product Data: Collect Product Data into a single submittal for each element or system. Mark each copy to show applicable choices and options. Where Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 1. Manufacturer's printed recommendations.

2. Compliance with recognized trade association standards.
 3. Compliance with recognized testing agency standards.
 4. Application of testing agency labels and seals.
 5. Notation of dimensions verified by field measurement.
 6. Notation of coordination requirements.
 7. Preliminary Submittal: Submit a preliminary single-copy where selection of options is required.
 8. Maintenance manuals. The Architect will retain one, and will return the other marked with action taken and corrections or modifications required.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 9. Distribution: Furnish copies of final submittal to installers, and others required for performance of construction activities. Show distribution on transmittal forms. Do not proceed with installation until an applicable copy of Product Data is in the installer's possession.
 - a. Do not permit use of unmarked copies of Product Data in connection with construction.
- I. Samples: Submit full-size Samples cured and finished as specified and identical to the product proposed. Mount, display, or package Samples to facilitate review. Prepare Samples to match the Architect's Sample. Include the following:
1. Generic description.
 2. Source.
 3. Product name or name of manufacturer.
 4. Compliance with recognized standards.
 5. Availability and delivery time.
 6. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics, and a comparison of these characteristics between the final submittal and the component as delivered and installed. Where variations are inherent in the product, submit multiple units that show limits of the variations. One approved sample must be submitted to the Owner's representative by the Contractor.
 - a. Refer to other Sections for Samples that illustrate details of assembly, fabrication techniques, workmanship, connections, operation and similar characteristics.
 - b. Refer to other Sections for Samples to be returned for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
 7. Preliminary submittals: Where Samples are for selection of characteristics from a range of choices, submit a full set of choices for the product. Preliminary submittals will be reviewed and returned indicating selection and other action.
 8. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken. Maintain Sample sets at the Project site, for quality comparisons.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- J. Distribution: Prepare additional sets for subcontractors, manufacturers, fabricators, installers, and others as required for performance. Show distribution on transmittal forms.

- K. Architect's Action: Except for submittals for record, information or similar purposes, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return. Compliance with specified characteristics is the Contractor's responsibility.
1. Action Stamp: The Architect will stamp each submittal with a self-explanatory action stamp. The stamp will be appropriately marked to indicate action taken.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

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SUBMITTAL COVERSHEET

Contractor: _____

Submittal Number: _____

Address: _____

Submittal Date: _____

City, State, Zip: _____

☐ First Submission

☐ Re-Submission

PROJECT IDENTIFICATION:

Name of Project: _____

Board of Trustees: _____

SA Project No.: _____

Specification Division No.: _____

Specification Section No. & Title: _____

Name of Product: _____

Name of Manufacturer: _____

Sub-Contractor: _____

Supplier: _____

Number of copies: _____

Is this a substitution? ☐ Yes ☐ Yes

If yes, has a matrix comparison been included? ☐ Yes ☐ No

If no, provide reason: _____

Comments:

END OF SECTION 01300

SECTION 01350 – MONTHLY SUBMISSION CHECKLIST

MONTHLY SUBMISSION CHECKLIST

Monthly Submission Checklist – Please note that this checklist does not constitute a transmittal. All items submitted in the package must be identified on a separate transmittal. If certain materials were submitted separately from the package, for example monthly project workforce reports and certified payrolls, then the date this material was submitted must be indicated on the checklist and the corresponding transmittals must be attached.

Attached to this monthly checklist are the following items and as outlined elsewhere within the contract documents.

1. _____ Original Board of Education Voucher.
2. _____ Payment Requisition.
3. Stored Materials:
 - 3a. _____ A letter from the contractor stating that payment for stored materials will result in an improvement in the contractor's progress on the construction schedule.
 - 3b. _____ A Bill of Sale naming the owner as having ownership of the material from the contractor, not from the subcontractor.
 - 3c. _____ Invoices and other material as back up to the nature and quantity of materials stored.
 - 3d. _____ Certificate of Insurance covering the stored materials.
4. _____ Lien waivers from subcontractors and material suppliers.
5. _____ Update construction schedule. (Bar chart or CPM)
6. _____ Complete list of the sub-contractors to date.
7. _____ Copy of daily reports.
8. _____ Update list of shop drawings to be submitted.
9. _____ Update list of shop drawings and current approval status.
10. _____ Project photographs.
11. _____ Prevailing wage manning reports (both prime & subcontractors).
12. _____ Certified Payrolls
13. Payment Application (AIA Document G702 and Continuation Sheets G703):
 - 13a. _____ The amounts identified in the payment application correspond with those approved on pencil copies verified by the owner's representative together with the architect in the field.
 - 13b. _____ No mathematical errors were evident, all columns were completed and the retainage percentage was correct.

- 13c. _____ Correct payment application forms were used (See Section 01027)
- 13d. _____ The payment application was signed by the contractor and notarized.
- 13e. _____ Other: (For example, outstanding General Submission Checklist items.)

CONTRACTOR PLEASE NOTE:

1. Payment Requisitions will not be processed unless all items of this checklist are submitted.
2. Shop drawings not submitted within the time requirements of the specifications will mandate Five (5%) percent of the payment requisition be retained the first month, Seven (7%) percent the second month, Nine (9%) percent the third month and so forth up to Fifteen (15%) percent.

COMPANY NAME

CONTRACTOR'S SIGNATURE

DATE

PROJECT NUMBER

PROJECT DATE

Payment requisitions will not be processed unless all items of this checklist are submitted.

THE ABOVE NOTED PAYMENT APPLICATION SUBMITTAL PACKAGE CONTAINS THE FOLLOWING
ITEMS AS INDICATED BY A CHECK MARK:

Note: Those items not marked with a check may be annotated with further information.

END OF SECTION 01350

SECTION 01500 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following: Temporary services and facilities, utilities, construction and support facilities, security and protection. Provide facilities ready for use. Maintain, expand and modify as needed. Remove when no longer needed, or replaced by permanent facilities.
- B. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner, except where noted.
- C. Temporary Facilities: Comply with applicable laws and regulations.
 - 1. Telephones: Provide temporary cellular telephone service for personnel engaged in construction. Provide a list of important telephone numbers.
 - 2. Storage, Fabrication Trailers, and Contractor Office Trailer: Provide trailers equipped to accommodate materials and equipment involved, and to serve as an office for the Contractor.
 - 3. Sanitary facilities include temporary toilets and drinking water facilities. Use existing designated toilets. Clean on a daily basis.
 - 4. Electric power. Use existing. Owner will pay use charge.
 - 5. Collection and Disposal of Waste: Collect waste daily. Comply with NFPA 241 for removal of combustible waste. Enforce requirements strictly. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose in a lawful manner.
 - 6. Temporary Interior Partitions, Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of barricades. Paint appropriate warning signs to inform personnel and the public of the hazard being protected against. Where needed provide lighting, including flashing lights. Keep all building exits operational at all times.
 - a. For temporary interior partitions and enclosure walls provide ½" thick fire rated plywood one side, over ½" type "X" gypsum board securely fastened to both sides of 20 Ga. 4" metal studs at 16" o.c. – (1) hr fire rating. Run the plywood up to 8'-0" AFF. Run the gypsum boards up to the deck above. Doors and frames to be (1) hr rated hollow metal knock down type – "B" label. Provide R-11 fiberglass batt insulation at temporary partitions and enclosure walls located at exterior walls.
- E. Environmental Protection: Operate temporary facilities and conduct construction by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints.
- F. Operation: Enforce strict discipline in use of temporary facilities. Limit availability to intended use to minimize abuse. Maintain facilities in good operating condition until removal.

- G. Termination and Removal: Remove each facility when the need has ended, or replaced by a permanent facility, or no later than Substantial Completion. Complete or restore construction delayed because of interference with the facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

END OF SECTION 01500

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock.
 - 1. "Named Products" are items identified by manufacturer's product name, including make or model designation indicated in the manufacturer's product literature.
- B. "Materials" are products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- C. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
- D. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
 - 1. When the Contractor has the option of selecting between two or more products, the product selected shall be compatible with products previously selected.
- E. Nameplates: Except for required labels and operating data, do not attach manufacturer's nameplates or trademarks on surfaces exposed to view in occupied spaces or on the exterior.
 - 1. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an inconspicuous accessible surface. The nameplate shall contain the following information and essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
- F. Product Delivery, Storage, and Handling: Deliver, store and handle products in accordance with manufacturer's recommendations, using methods that will prevent damage, deterioration and loss.
 - 1. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
 - 2. Deliver products in manufacturer's original sealed container or packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
 - 3. Inspect products on delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

4. Store products to facilitate inspection and measurement of quantity or counting of units. Store heavy materials away from the structure in a manner that will not endanger supporting construction.
 5. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
- G. Product Selection: Provide products that comply with the Contract Documents, are undamaged and unused at installation.
1. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 2. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 3. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
 - a. Where products are specified by name, accompanied by the term "or equal" comply with provisions for "substitutions" to obtain approval for use of an unnamed product.
 4. Non-Proprietary Specifications: When Specifications list products or manufacturers that are available and may be used, but do not restrict the Contractor to use of these products only, the Contractor may propose any product that complies with Contract requirements. Contractor must comply with Division 1 Section "Product Substitutions", to obtain approval for use of an unnamed product.
- H. Descriptive Specification Requirements: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that provides the characteristics and otherwise complies with requirements.
1. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply and are recommended for the application. Manufacturer's recommendations may be contained in product literature, or by certification of performance.
 2. Compliance with Standards: Where Specifications require compliance with a standard, select a product that complies with the standard specified.
 3. Visual Matching: Where Specifications require matching a Sample, the Architect's decision on whether a proposed product matches is final. Where no product matches and complies with other requirements, comply with Division 1 Section "Product Substitutions", for selection of a matching product in another category.
 4. Visual Selection: Where requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product that complies with other requirements. The Architect will select color, pattern and texture from the product line selected.
- I. Installation of Products: Comply with manufacturer's instructions and recommendations for installation of products. Anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect to ensure freedom from damage and deterioration at time of Substantial Completion.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01600

SECTION 01631 - PRODUCT SUBSTITUTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Substitutions requested ten (10) days (Saturdays, Sundays or holidays excepted) prior to the bid date, and accepted by the Architect prior to award of Contract.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. Compliance with governing regulations and orders issued by governing authorities.
- B. Submittal: Except as otherwise noted in specific sections of these specification requests for substitution will be considered if received within forty-five (45) days after a notice to proceed has been issued to the bid. Requests received after more than forty-five (45) days after the issuance of a notice to proceed may be considered or rejected at the discretion of the Architect.
 - 1. Submit 3 copies of each request for substitution in the form and in accordance with procedures for Change Order proposals.
 - 2. Identify the product, or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Document compliance with requirements for substitutions, and the following information, as appropriate:
 - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A comparison of significant qualities of the proposed substitution with those specified.
 - d. A list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will be necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Construction Schedule compared to the Schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification that the substitution is equal-to or better in every respect to that required by Contract Documents, and that it will perform adequately in application indicated. Include Contractor's waiver of rights to additional payment or time that may be necessary because of the substitution's failure to perform adequately.
 - 3. Architect's Action: Within one week of receipt of the request for substitution, the Architect will request additional information necessary for evaluation. Within 2 weeks of receipt of the request, or one week receipt of additional information, whichever is later, the Architect will notify the Contractor of acceptance or rejection. If a decision on use of a

substitute cannot be made within the time allocated, use the product specified.
Acceptance will be in the form of a Change Order.

- C. Substitutions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
Proposed changes are in keeping with the general intent of Contract Documents.
 2. The request is timely, fully documented and properly submitted.
 3. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 4. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 6. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate contractors, and similar considerations.
 7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- D. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01631

SECTION 01700 - PROJECT CLOSEOUT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Substantial Completion: Before requesting inspection for certification of Substantial Completion, complete the following:
 - 1. In the Application for Payment that coincides with the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed substantially complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 3. Submit record drawings, maintenance manuals, damage or settlement survey and similar record information.
 - 4. Complete final clean up. Touch-up and repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Architect will proceed or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance.
 - 3. Should a third inspection be required as a result of the Contractor's failure to complete work, then the costs associated with the reinspection will be borne by the Contractor and not the Owner.
- C. Final Acceptance: Before requesting inspection for certification of final acceptance and final payment, complete the following:
 - 1. Submit final payment request with releases.
 - 2. Submit a final statement, accounting for changes to the Contract Sum.
 - 3. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
 - 4. Submit AIA G707 Consent of Surety to final payment.
 - 5. Submit evidence of continuing insurance coverage complying with insurance requirements.
 - 6. Submit AIA G706A Release of Liens form.
 - 7. Submit AIA G706 Payment of Debits and Claims form.
- D. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, re-inspection will be repeated. However, the costs associated with the reinspection as a result of the Contractor's failure to complete work will be borne by the Contractor and not the Owner.
- E. Record Document Submittals: Do not use Record Documents for construction purposes; protect from loss in a secure location; provide access to Record Documents for the Architect's reference.
- F. (not used)
- G. Record Specifications: Maintain one copy of the Project Manual, including addenda. Mark to show variations in actual Work performed in comparison with the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot be readily discerned later by direct observation. Note related record drawing information and Product Data.
1. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.
- H. Removal of Protection: Remove temporary protection and facilities.
- I. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials from the site and dispose of in a lawful manner.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01700

SECTION 01701 – PROJECT CLOSEOUT SUBMISSION CHECKLIST

PROJECT CLOSEOUT SUBMISSION CHECKLIST

Please note that this checklist does not constitute a transmittal. All items submitted in the package must be identified on a separate transmittal.

If certain materials were submitted separately from this package, corresponding transmittal(s) must be attached and appropriate column checked, as to whether item(s) was submitted to Owner, Architect or Owner's representative. Refer to Page #3.

Attached to this checklist are the following items, along with any additional items as may be required elsewhere within the contract documents for final closeout.

1. Project Closeout: To the requirements of Division 1 Section 01700 "Project Closeout".
 - 1a. _____ Final Payment Application (AIA Document G702 and Continuation Sheets G703); with final Certified Payrolls and Prevailing Wage Manning Reports.
 - 1b. _____ Board of Trustees Voucher for Final Payment.
 - 1c. _____ AIA 707 Consent of Surety to final payment.
 - 1d. _____ AIA G706A Contractor's Affidavit of Release of Liens – with Subcontractors' releases of liens attached.
 - 1e. _____ AIA G706 Contractor's Affidavit of Payment of Debts and Claims.
 - 1f. _____ Final Statement of Accounting for changes to the Contract Sum. Statement shall reflect all adjustments.
 - a. Original Contract Sum
 - b. Additions and deductions resulting from:
 - Previous Change Orders.
 - Cash allowances.
 - Unit Prices.
 - Other adjustments.
 - Deductions for liquidated damages.
 - Deductions for re-inspection payments for additional A/E inspections and services.
 - Deductions for reimbursements of contractor's work performed by Owner or other prime contractors.
 - c. Total Contract Sum, as adjusted.
 - d. Previous payments.
 - e. Sum remaining due.
 - 1g. _____ Final adjustment Change Order based upon the Final Statement of Accounting from item "1f." above.
 - 1h. _____ A copy of the final inspection list stating that each punch list item has been completed or otherwise resolved for acceptance.

2. Warranties and Bonds: To the requirements of Division 1 Section 01740 "Warranties and Bonds".

2a. _____ Standard Product Warranties.

2b. _____ Special Warranties.

2c. _____ Maintenance Bond.

NOTE: During the eleventh month after the date of final acceptance of the work, the Owner, Architect, Owner's representative and the Contractor shall review the work to confirm the requirements of the Contract have been satisfied. Any corrective work associated with the warranty will be addressed at that time, prior to the expiration of the warranty. This requirement will not modify any of the specific Contractor's obligations relative to their Contract Agreement, specifically those relating to warranties that are in effect for a period greater than one (1) year.

3. Project Record Documents: To the requirements of Division 1 Section 01720 "Project Record Documents".

3a. (not used)

3b. _____ Record Specifications.

3c. _____ Record Shop Drawings.

3d. _____ Record Product Data Submittals.

3e. _____ Record Sample Submittals.

3f. _____ Operations and Maintenance Manuals.

3g. _____ Miscellaneous Record Submittals.

4. _____ Certificates of Inspections: To the requirements of the General Conditions and individual technical sections of the Specifications.

- As required by Building Code.

CONTRACTOR PLEASE NOTE:

Final Payment Requisition will not be processed unless all applicable items of this checklist are submitted.

COMPANY NAME

CONTRACTOR'S SIGNATURE

DATE

PROJECT NAME AND NUMBER

THIS PROJECT CLOSEOUT SUBMITTAL PACKAGE CONTAINS THE FOLLOWING ITEMS AS INDICATED IN THE ABOVE LISTING BY A CHECK MARK. LIST ITEMS BELOW.

Note: Provide appropriate copies of transmittal if item(s) was submitted separately from this package, and provide check mark as to whether it was sent to the Owner, Architect or Owner's representative.

		<u>Previously submitted to</u>		
		<u>Owner</u>	<u>Arch</u>	<u>Owner Rep</u>
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(ADD ADDITIONAL PAGE(S) AS REQUIRED)

END OF SECTION 01701

SECTION 01710 - FINAL CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for final cleaning at Substantial Completion.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Temporary Facilities" specifies general cleanup and waste-removal requirements.
 - 2. Division 1 Section "Project Closeout" specifies general contract closeout requirements.
 - 3. Special cleaning requirements for specific construction elements are included in appropriate Sections.
- C. Single Prime Contract: The Contractor is responsible for final cleaning his own Work. The Contractor is responsible for coordinating final cleaning of an area or piece of equipment where more than one subcontractor is involved.
- D. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and antipollution regulations.
 - 1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final-cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning.

- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.
 - 1. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
 - 2. Leave the Project clean and ready for occupancy.
- C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- D. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 01710

SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.
- B. Project Record Documents required include the following:
 - 1. (not used).
 - 2. Marked-up copies of Shop Drawings.
 - 3. Newly prepared drawings.
 - 4. Marked-up copies of Specifications, addenda, and Change Orders.
 - 5. Marked-up Product Data submittals.
 - 6. Record Samples.
 - 7. Field records for variable and concealed conditions.
 - 8. Record information on Work that is recorded only schematically.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" specifies general requirements for preparing and submitting Project Record Documents.
 - 2. Division 1 Section "Project Closeout" specifies general closeout requirements.
- D. The contractor is responsible for obtaining, maintaining, and recording Project Record Document information for its own Work. The Contractor is responsible for coordinating information, where information from more than one sub-contractor is to be integrated with information from other sub-contractors, to form one combined record.
- E. Maintenance of Documents and Samples: Store record documents and Samples apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and Samples available at all times for the Architect's inspections.

1.3 RECORD SPECIFICATIONS

- A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
 - 1. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications and modifications issued. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
 - a. In each Specification Section where products, materials, or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

- b. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.
 - c. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
 2. Upon completion of markup, submit record Specifications to the Architect for the Owner's records.

1.4 RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.
 1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders.
 4. Upon completion of markup, submit a complete set of record Product Data to the Architect for the Owner's records.
 5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

1.5 RECORD SAMPLE SUBMITTAL

- A. Immediately prior to date of Substantial Completion meet with the Architect and the Owner's personnel at the site to determine which of the Samples maintained during the construction period shall be transmitted to the Owner for record purposes. Comply with the Architect's instructions for packaging, identification marking, and delivery to the Owner's Sample storage space. Dispose of other Samples in a manner specified for disposing surplus and waste materials.

1.6 MAINTENANCE MANUAL SUBMITTAL

- A. When each construction activity that requires submittal of maintenance manuals is nominally complete, but before Substantial Completion, submit maintenance manuals specified.
 1. Organize operation and maintenance manuals into suitable sets of manageable size.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project.

END OF SECTION 01720

SECTION 01740 - WARRANTIES AND BONDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in Contract Documents, to extend time limits provided by standard warranties or to provide greater rights for the Owner.
 - 1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
- C. Requirements for warranties for products and installations that are specified to be warranted, are included in the individual Sections of these specifications.
 - 1. During the eleventh month after the date of final acceptance of the work, the Owner, Architect, Owner's representative and the Contractor shall review the work to confirm the requirements of the Contract have been satisfied. Any corrective work associated with the warranty will be addressed at that time, prior to the expiration of the warranty. This requirement will not modify any of the specific Contractor's obligations relative to their Contract Agreement, specifically those relating to warranties that are in effect for a period greater than one (1) year.
- D. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.
- E. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- F. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- G. Replacement Cost: On determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through part of its useful service life.
- H. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 - a. The Owner reserves the right to refuse to accept Work where a special warranty or similar commitment is required, until evidence is presented that entities required to countersign commitments are willing to do so.
- I. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion, submit written warranties on the Architect's request.
 1. When a designated portion of the Work is completed and occupied or used, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.
- J. When a special warranty is to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
- K. Special warranty forms are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the Owner through the Architect for approval prior to final execution.
 1. Refer to individual Sections of the specifications for specific content, and particular requirements for submittal of special warranties.
- L. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.
 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each warranty, as necessary, for inclusion in each required manual.

END OF SECTION 01740

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 PREINSTALLATION MEETINGS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Predemolition Photographs or Video: Submit before Work begins.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.5 CLOSEOUT SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. Loose furniture and equipment.
- C. Notify Architect 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.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. [Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
 - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. [Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. 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.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
- 1. 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.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. 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.
 - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 5. Dispose of demolished items and materials promptly.[Comply with requirements in Section 017419 "Construction Waste Management and Disposal."]
- B. Removed and Salvaged Items:
- 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition[and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

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

END OF SECTION 024119

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Slabs-on-grade.
 - 4. Suspended slabs.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
 - 2. Division 07 Section "Under Slab Vapor Barrier"

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Each mix design shall be accompanied by either a standard deviation analysis or trial mixture analysis backup in accordance with ACI 318(14). Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement", and as shown on the drawings. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
 - 1. Shop drawings shall bear the initials of both the detailer and checker for the detailing agency employed by the Contractor to indicate that the said shop drawings have been checked by the shop prior to submission.
 - 2. Any errors, including omissions, coordination, and errors in dimensions shown on the shop drawings shall be the responsibility of the Contractor.

- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- E. Qualification Data: For testing agency.
- F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates.
- G. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Waterstops.
 - 6. Curing compounds.
 - 7. Floor and slab treatments.
 - 8. Bonding agents.
 - 9. Adhesives.
 - 10. Vapor retarders.
 - 11. Semirigid joint filler.
 - 12. Joint-filler strips.
 - 13. Repair materials.
- H. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- I. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, **acceptable to Engineer/ Architect** qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency

laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete,"
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
 - 3. ACI 318-2014, "Building Code Requirements for Structural Concrete."
 - 4. ACI 347R, "Recommended Practice for Concrete Formwork."
 - 5. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
 - 6. ASTM C94-2013, "Specification for Ready-Mixed Concrete."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. 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 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Plain-Steel Wire: ASTM A 82, as drawn.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II. Foundation Concrete may be supplemented with the following:
 - a. Fly Ash: ASTM C 618, Class F.
 - 2. Brand of cement shall not be changed during progress of job unless approved in writing by Engineer/Architect.
 - 3. The cement shall not contain any ingredients as shown by cement mill certificates which would cause more than 3 percent air to be entrained in the concrete when cement is used in the concrete mix.
 - 4. Cement shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter.
 - 5. No foreign cement (non-domestic cement) shall be permitted in concrete.
- B. Normal-Weight Aggregates: ASTM C 33, Class Severe weathering region, but not less than 4S coarse aggregate or better, graded. Provide aggregates from a single source. Provide uniformly graded aggregate and the maximum size of coarse aggregate shall not exceed one-fifth of minimum dimension between forms of member for which concrete is to be used, three-fourths of minimum clear spacing between reinforcing bars or 1 inch, whichever is smaller.
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) for footings, 3/4 inch (19 mm) nominal for slabs.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement. C.

Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

- A. General: No admixture shall be used in concrete unless specified herein, except with the permission of the Engineer/Architect. No changes of admixtures shall be made after design mix approval. Contractor shall provide the services (including any expenses) of the admixture manufacturer's representative to assure proper use of admixtures.
1. Prohibited Admixtures: Only the specified non-corrosive, non-chloride, noncorrosive accelerator shall be used. Calcium chloride, thiocyanates, or admixtures containing more than 0.05 percent chloride ions are not permitted.
 2. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of the admixture is required from the admixture manufacturer prior to mix design review by the Engineer/Architect.
- B. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Air-Mix" or "AEA-92"; Euclid Chemical Company
 - b. "Sika Aer"; Sika Corporation
 - c. "MB AE 90" or "Micro-Air"; Master Builders
 - d. "Daravair -1000" or "Darex II"; W. R. Grace & Co.
 - e. or equal
- C. Water-Reducing Admixture: ASTM C494, Type A, and containing not more than 0.05 percent chloride ions.
1. Water-Reducing Admixture: ASTM C494, Type A, and containing not more than 0.05 percent chloride ions.
 - a. "WRDA with Hycol"; W. R. Grace & Co.
 - b. "Eucon WR-75" or "Eucon WR-89"; Euclid Chemical Company
 - c. "Plastocrete 161"; Sika Chemical Corporation
 - d. "Polyheed 997" or "Pozzolith 220-N"; Master Builders.
 - e. or equal
- D. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C494, Type F or Type G and containing not more than 0.05 percent chloride ions.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Sikament - 300"; Sika Chemical Corporation
 - b. "Eucon 37"; Euclid Chemical Company
 - c. "Daracem-100" or "WRDA-19"; W. R. Grace & Co.
 - d. "Rheobuild 1000"; Master Builders.
 - e. or equal

- E. Water-Reducing, Non-Corrosive, Non-Chloride Accelerator Admixture: ASTM C494, Type C or E, and containing not more than 0.05 percent chloride ions. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures.
1. Products: Subject to compliance with requirements, provide one of the following:
- a. "Accelguard 80"; Euclid Chemical Co.
 - b. "Polarset"; W. R. Grace & Co.
 - c. "Pozzutec 20" or "Pozzolith NC-534"; Master Builders
 - d. "Plastocrete 161FL"; Sika Chemical Corporation
 - e. or equal
- F. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and containing not more than 0.05 percent chloride ions.
1. Products: Subject to compliance with requirements, provide one of the following:
- a. "Eucon Retarder 75"; Euclid Chemical Co.
 - b. "Daratard 17"; W.R. Grace & Co.
 - c. "Plastocrete 161R"; Sika Chemical Co.
 - d. "Pozzolith 122R"; Master Builders.
 - e. or equal

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating.
1. Products:
- a. Dayton Superior Corporation; Safe Cure and Seal (J-19).
 - b. Euclid Chemical Company (The); Diamond Clear VOX.
 - c. L&M Construction Chemicals, Inc.; Dress & Seal WB.
 - d. or equal

- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:
 - a. Euclid Chemical Company (The); Super Diamond Clear VOX.
 - b. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
 - c. Meadows, W. R., Inc.; Vocomp-30.
 - d. or equal

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber .
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Reglets: Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash, as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 25 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
 2. No fly ash shall be used in the slab concrete.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. All concrete slabs placed at temperatures below 50 degrees F shall contain the specified non-corrosive, non-chloride accelerator.
 5. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4500 psi at 28 days.
 2. Minimum Cementitious Materials Content: 600 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.44.
 4. Slump Limit: Not less than 1" and not more than 4"
 5. Air Content: All concrete exposed to freezing and thawing, deicer chemicals and/or required to be watertight or subjected to hydraulic pressure or soil shall have an air content of 5.5% to 8%.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 600 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.47 Interior slabs, 0.44 exterior slabs.
 4. Slump Limit: 3 inches.
 5. Air Content: All concrete exposed to freezing and thawing, deicer chemicals and/or required to be watertight or subjected to hydraulic pressure or soil shall have an air content of 5.5% to 8%.
 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- C. Suspended Slabs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 600 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.47.
 4. Slump Limit: 3 inches.

5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
 2. Delete the reference for allowing additional water to be added to the batch for material with insufficient slump. Addition of water to the batch will not be permitted.
 3. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced, cement content and admixture used.
- B. Project-Site Mixing: Project-Site Mixing shall not be permitted without approval from the engineer.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. The design and engineering of formwork, as well as its construction, shall be the responsibility of the Contractor. It shall be the Contractor's total responsibility to insure safety to workmen, public and for the total structure at all times. The Contractor shall be responsible to use firm unyielding supports and provide adjustable devices for setting, wedging, and lending the finished forms in correct alignment and position with all work in conformity with governing building code requirements and these specifications. The Contractor shall be responsible to pay for all costs connected with design of this work (forms, shores, etc.), checking same and certification to Engineer/Architect and Building Department. Such form design shall be performed by a professional engineer licensed in the state of the project and experienced in such form design. When the load on the shores exceeds 150 pounds per square foot, or power buggies are used, the Contractor shall certify that the form, shore, and bracing design has been checked and approved by a professional engineer licensed in the state of the project with at least five (5) years experience and installation of this work has been done in conformity with the approved design. The design, tolerance of finished lines and camber to compensate for deflection due to weight of fresh concrete shall conform to ACI-347, "Guide to Formwork for Concrete." Construct forms to slopes, lines and dimensions shown, plumb and straight and sufficiently tight to prevent leakage,

securely brace and shore forms to prevent displacement and to safely support construction loads. Provide access openings for cleaning and inspecting forms and reinforcing.

- C. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- D. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces. E.

Construct forms tight enough to prevent loss of concrete mortar.

- F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.
4. Conduits and pipes embedded in concrete slabs, beams and walls shall be in accordance with ACI Building Code requirements, latest edition, and as herein specified. Where there are banks of conduits or pipes in slabs, 6" x 6" - #6 mesh shall be placed under or over these banks of conduits or pipes and run beyond each side at least 12 inches. Extra reinforcement shall be installed as per Engineer/Architect's or his representative's directions for conduits and pipes, penetrating walls, etc. Any conduit or bank of conduits or pipes which impair the structural strength of the structural element involved shall not be permitted. No conduit and/or pipe shall be tied parallel to the reinforcing bar which would reduce bond of same reinforcing bar. No aluminum conduit and/or pipe shall be allowed to be embedded in concrete. Where there are expansion joints, proper conduit or pipe expansion sleeves shall be installed to allow proper freedom of movement. No conduits shall be placed to run through columns, including the slab or beams within the area of any column. Conduit in structural slab shall be permitted only for home runs and branch conduit work for fixtures in exposed ceilings areas. In rib construction, any cross

or conduits within the floor slab shall occur at the ribs with crossing conduit dropping into rib. At no point shall the concrete covering be less than 3/4 inch.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. After substantial delay in the work previously started, reinforcing steel shall be inspected and cleaned free from mortar prior to proceeding with the work.
- G. No concrete placement shall be allowed when, in Engineer/Architect's opinion, insufficient time is provided to review and correct misplaced reinforcing steel.
- H. Bends or hooks unless otherwise shown or required shall be cold formed around pins. Hooks shall be ACI Standard.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to

time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Unless otherwise provided, concrete footings and exterior slab and foundations shall be placed directly on undisturbed or structurally compacted backfill surfaces that are thoroughly moistened but not muddy at time concrete is placed. There shall be no free water present at footing bottoms between time of final excavation to grade and concrete placement.
- G. Where established bottoms of footings for bearing as shown on drawings have not been maintained or have been disturbed, all loose material shall be removed to good bottom and the footings may be placed at the lower level with increase in length of vertical reinforcement required to reach the lowered footing or a plain concrete pad may be placed up to the former level of bottom of footing.

- H. Concrete shall not be allowed to drop freely where reinforcing will cause segregation nor shall it be dropped freely more than ten (10) feet for concrete containing the high range water reducing admixture (superplasticizer) or five (5) feet for other concrete
- I. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. It shall be the Contractor's complete responsibility to place and maintain concrete at the specified minimum internal temperature of at least 50° F, for as long as necessary to assure proper strength for safety, stripping and obtaining design strengths with non-excessive deflections. Cold weather requirements regarding class of protection, time period of heat, enclosures, coverings, etc., shall be as required to accomplish the above. When atmospheric temperatures are predicted to fall below 30 deg F, the Contractor shall obtain approval to pour from Engineer/Architect. Class of concrete protection and Contractor's ability to meet all Specification requirements shall determine approval or non-approval.
 - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- J. Hot-Weather Placement: Comply with ACI 301 and as follows:
 - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Scratch Finish: After placing slabs, plane surface to tolerances for floor flatness (FF) of 20 and floor levelness (FL) of 15. Slope surfaces uniformly to drains where required. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture. Check and level surface plane to tolerances of FF 23/FL 17. Uniformly slope surfaces to

drains. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

- a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
- b. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm)

- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
 - 1. Uniformly spread 25 lb/100 sq. ft. (12 kg/10 sq. m) of dampened slip-resistive aggregate over surface in 1 or 2 applications. Tamp aggregate flush with surface, but do not force below surface.
 - 2. After broadcasting and tamping, apply float finish.
 - 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with inplace construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Grout base plates and bearing plates as indicated, using specified non-shrink non-metallic grout. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than 10 sq. ft.
- E. Reinforced Masonry: Provide concrete grout for reinforced masonry, lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process

24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least **[one]** **[six]** month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or

that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
 8. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 12. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- C. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

END OF SECTION 033000

SECTION 035416 - HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hydraulic-cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
 - 1. Product Data for Credit IEQ 4.2: For primer, documentation including printed statement of VOC content.
 - 2. Laboratory Test Reports for Credit IEQ 4: For primer, 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."

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.

PART 2 - PRODUCTS

2.1 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Products: Subject to compliance with requirements, **[provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]**:
 - a. Ardex; K-15 Self-Leveling Underlayment Concrete.

- b. BASF Construction Chemicals, Inc.; [**Chemrex Self-Leveling Underlayment**] [**MBT Mastertop 110 Plus Underlayment**].
 - c. Bonsal American, an Oldcastle company; [**ProSpec Level Set 200**] [**ProSpec Level Set 300**] [**ProSpec Level Set LW-60**].
 - d. CGM, Incorporated; PRO S.L.U. Self-Leveling Underlayment.
 - e. CMP Specialty Products, Inc.; [**Level Finish**] [**Level Finish 210**] [**LF W**].
 - f. Dayton Superior Corporation; [**EconoLevel**] [**Levelayer**].
 - g. Dependable Chemical Co., Inc.; [**Skimflow ES**] [**Skimflow LC**] [**Skimflow RS**] [**Skimflow Lite**].
 - h. Euclid Chemical Company (The); [**Super Flo-Top**] [**Level Magic**] [**TAMMS SLU**].
 - i. L&M Construction Chemicals, Inc.; Levelex.
 - j. Lambert Corporation; Lambco L-16 Self-Level.
 - k. MAPEI Corporation; [**Novoplan Easy**] [**Novoplan 2**] [**Ultraplan Easy**] [**Ultraplan 1 Plus**].
 - l. Maxxon Corporation; Level-Right.
 - m. Metalcrete Industries; Flowpave.
 - n. RAECO, Inc.; S.L.U.
 - o. Specialty Construction Brands, Inc., an H.B. Fuller company; [**TEC Smooth Start**] [**TEC EZ Level**].
 - p. Teck Specialties; Teck 2800.
 - q. USG Corporation; [**Levelrock SLC 300**] [**Levelrock SLC 400**].
 - r. US SPEC, Division of US Mix Products Company; US SPEC Self-Leveling Underlayment.
 - s. **<Insert manufacturer's name; product name or designation>**.
2. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
 3. Compressive Strength: Not less than 4000 psi (27.6 MPa) **<Insert value>** at 28 days when tested according to ASTM C 109/C 109M.
 4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
1. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.
 2. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
 - 1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of **[3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m)]** <Insert value> in 24 hours.
- C. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
 - 1. Install underlayment reinforcement.
- D. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces.
- E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment.

3.2 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
 - 1. Apply a final layer without aggregate to product surface.
 - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

END OF SECTION 035416

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's).
2. Pre-faced concrete masonry units.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Contractor will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of product indicated.
- B. Shop Drawings:** For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- C. Samples for Verification:** For each type and color of exposed masonry unit and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:** For each type and size of product indicated. For masonry units include data on material properties, material test reports substantiating compliance with requirements.
- B. Mix Designs:** For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 - 1. Build sample panels for typical interior wall in sizes approximately 48 inches (1200 mm) long by 36 inches (900 mm) high.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- C. CMUs: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
 - 2. Density Classification: Normal weight unless otherwise indicated].
- D. Decorative CMUs: ASTM C 90.

1. Products: Subject to compliance with requirements, provide the "Baselite" ground face masonry unit or equal and approved.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
3. Density Classification: Normal weight.
4. Pattern and Texture:
 - a. Standard pattern, ground-face finish.

2.3 CONCRETE AND MASONRY LINTELS

- A. General: Provide one of the following:
- B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than CMUs.

2.4 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Cemex S.A.B. de C.V.; [Brikset Type N] [Citadel Type S] [Dixie Type S] [Kosmortar Type N] [Richmortar] [Victor Plastic Cement].
 - c. Essroc, Italcementi Group; [Brixment] [or] [Velvet].
 - d. Holcim (US) Inc.; [Mortamix Masonry Cement] [Rainbow Mortamix Custom Buff Masonry Cement] [White Mortamix Masonry Cement].
 - e. Lafarge North America Inc.; [Magnolia Masonry Cement] [Lafarge Masonry Cement] [Trinity White Masonry Cement].
 - f. Lehigh Cement Company; [Lehigh Masonry Cement] [Lehigh White Masonry Cement].
 - g. National Cement Company, Inc.; Coosa Masonry Cement.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.
- G. Colored Cement Product: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Colored Portland Cement-Lime Mix:
 - 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
 - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
 - 3) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - 4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
 - b. Colored Masonry Cement:
 - 1) Capital Materials Corporation; Flamingo Color Masonry Cement.
 - 2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
 - 3) Essroc, Italcementi Group; Brixment-in-Color.
 - 4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
 - 5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
 - 6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
 - 7) National Cement Company, Inc.; Coosa Masonry Cement.
- H. Aggregate for Mortar: ASTM C 144.
 1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Aggregate for Grout: ASTM C 404.
- J. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.
- K. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); Accelguard 80.

- b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
- c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

L. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
 - 1. Interior Walls: Hot-dip galvanized, carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
 - 1. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- E. Partition Top anchors: 0.105-inch- (2.66-mm-) thick metal plate with 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.

- 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
 - 3. For exterior masonry, use portland cement-lime or masonry cement mortar.
 - 4. For reinforced masonry, use portland cement-lime or masonry cement mortar.
 - 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For mortar parge coats, use Type S.

4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Pigmented Mortar: Use colored cement product[or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products].
 1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of masonry cement by weight.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Concrete facing brick.
 - d. Face brick.
 - e. Hollow brick.
 - f. Glazed structural-clay facing tile.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 1. Mix to match Architect's sample.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Concrete facing brick.
 - d. Face brick.
 - e. Hollow brick.
 - f. Glazed structural-clay facing tile.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa)].
 3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings[in addition to continuous reinforcement].
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.7 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.8 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 1 special inspections according to the "International Building Code."
 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for [mortar air content] [and] [compressive strength].
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.9 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm).
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.10 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Protect surfaces from contact with cleaner.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 - 6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.11 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 04 30 16 CEMENT BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cement board
2. Installation materials including adhesives, mortars, and pointing mortars.
3. Masonry:
 - B. Related Requirements:
 1. Division 7 Weather Barrier section(s).
 2. Division 7 Joint Sealants section(s).

1.2 REFERENCES

A. American National Standards Institute (ANSI)

1. ANSI A118.4 – Modified Dry-Set Cement Mortar.
2. ANSI A118.5 – Improved Modified Dry-Set Cement Mortar.
3. ANSI A118.9 – Test Methods and Specifications for Cementitious Backer

Units. B. ASTM International (ASTM)

- ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
2. ASTM C91 - Standard Specification of Masonry Cement.
3. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
4. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
5. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products.
6. ASTM C1002 - Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
7. ASTM C1088 - Standard Specification for Thin Veneer Brick Units Made From Clay or Shale

8. ASTM C1325 - Standard Specification for Non Asbestos Fiber Mat Reinforced Cementitious Baker Units.
9. ASTM C1670 - Standard Specification for Adhered Manufactured Stone Masonry Veneer Units
10. ASTM C1780 - Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer
11. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
12. ASTM E72 - Standard Test Methods of Conducting Strength Test of Panels for Building Construction

C. ICC - International Code Council Evaluation Service (ICC-ES):

1. ICC-ES AC 376: Acceptance Criteria for Reinforced Cementitious Sheets Used As Wall Sheathing and Floor Underlayment

1.4 SUBMITTALS

- A. Refer to Section 01 30 00 Submittal Procedures
- B. Manufacturer Warranty: Submit project specific letter of intent to provide specified warranty of installation system.
- C. Product Data: Submit current product literature for each product used in assembly.
- D. Reports:
 1. Third party building code evaluation report indicating cement board is approved for use in exterior application in accordance with ICC-ES AC 376.
- E. Sustainable Design Submittals
 1. Documentation indicating products fabricated within 500 mile radius of the Project Site from materials that have been extracted, harvested, or recovered within 500 miles of the Project Site.
 2. VOC content of adhesive materials.

QUALITY ASSURANCE

- A. Mock-ups

1. Adhered masonry mock-up shall incorporate surrounding construction, including wall assembly, fasteners, flashing, and other related accessories installed in accordance with manufacturer's installation methods.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect masonry to prevent staining, chipping, spalling or contamination caused by water, freezing, foreign matter, and other adverse conditions.
- B. Store installation materials in a dry location, in accordance with manufacturers' recommendations.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperature to comply with manufacturers requirements, during installation and for a minimum of seven days after completion of adhered to wall.
- B. Vent temporary heaters to the exterior to prevent carbon dioxide damage to cementitious products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Cement Board

1. Basis of Design: PermaBase® Brand Cement Board by National Gypsum Company, Charlotte, NC.
2. Subject to compliance with requirements, other manufacturers providing materials may include:
 - a. Wonderboard.
 - b. USG Fiberock
 - c. Denshield
 - b. Or Approved Equal
3. Characteristics
 - a. Manufactured in accordance with ASTM C1325 and ANSI 118.9

- b. Shear Bond Strength: greater than or equal to 200 psi, when tested in accordance with ANSI 118.4
- c. Approved for exterior use in accordance with ICC-ES AC 308
- d. Mold resistant panel score of 10 when tested in accordance with ASTM D3273
- e. Core consisting of cement [**polystyrene beads,**] and aggregates. Both faces to have embedded fiberglass mesh.
- f. Face Finish:

- 1) Unexposed face: smooth finish
- 2) Exposed face: cementitious finish

g. [Moisture absorption of less than 8 percent when tested in accordance with ASTM C473.]

- h. Thickness: [**5/8 inch (16 mm)**]

4. Accessories

- a. Tape: 4 inch (102 mm) wide polymer-coated (alkali resistant) mesh tape.
- b. Fasteners: Drill point screws (No. 8) wafer head, corrosion-resistant, Type S-12 screws or equivalent, complying with ASTM C1002. Minimum 1-5/8 inches (41 mm) long.

PART 3 - EXECUTION

3.1 EXAMINATION

3.2 CEMENT BOARD INSTALLATION

- A. Fasten Cement Board horizontally or vertically on interior of CMU wall.
 - 1. Penetrate wall with minimum of 3/8 inch (9.53mm) with fastener.
 - 2. Space fasteners 8 inches (20 cm) on center maximum along perimeter and in field of cement board unless noted otherwise.
 - 3. Place fasteners a minimum of 3/8 inch (9.53 mm) and a maximum of 5/8 inch (16 mm) from the cement board edge.
 - 4. Drive fastener heads flush with the face of the cement board.

- B. Stagger vertical joints of the cement board. Locate joints over framing members.
- C. Offset horizontal joints in cement board a minimum of 12 inches (30.48 cm) from horizontal joints in sheathing.
- D. Offset vertical joints in cement board a minimum of one stud space from vertical joints in sheathing.
- E. Offset joints in cement board a minimum of 8 inches from the corners of openings by "L" cutting cement board around openings.
- F. Treat cement board joints and corners with 4" wide alkali-resistant fiberglass mesh tape imbedded in LATICRETE® Polymer Fortified Veneer Mortar. Allow the taping treatment to cure for 12 to 24 hours at 70° F (21 °C).

3.3 SUBSTRATE TOLERANCES

- A. Maximum deviation in plane: Not to exceed 1/4 inch (6.35 mm) in 10 feet (3.05m), with not more than 1/16 inch (1.6 mm) variation in 1 foot (.305 m)

END OF SECTION 04 30 16

SECTION 051200 STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 01 Specification Sections, apply to this Section.
- B. Related Specification Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Quality Control Services" for independent testing agency procedures and administrative requirements.
 - 2. Division 04 Section "Unit Masonry" for masonry anchors.
 - 3. Division 05 Section "Steel Deck" for field installation of shear connectors.
 - 4. Division 05 Section "Metal Fabrications" for miscellaneous steel fabrications and other metal items not defined as structural steel.
 - 5. Division 01 Section "Construction Waste Management"
 - 6. Divisions 01, Section "Construction Facilities and Temporary Controls".

1.2 DESCRIPTION OF WORK

- A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections and type of steel required.
- B. Products furnished but not installed under this section:
 - 1. Anchor bolts for installation into masonry or concrete.
 - 2. Loose base plates and bearing plates set on masonry or concrete.
 - 3. Loose lintels.
 - 4. Provide all steel lintels, erect all lintels attached to other steel or weighing more than 200 pounds.

1.3 SUBMITTALS

- A. Submit the following for formal review and approval by the Architect according to Conditions of the Contract and Division 1 Specification Sections:
 - 1. Product Data: Submit manufacturer's specifications and installation instructions for the following products:
 - a. High-strength bolts (each type), including nuts and washers.
 - b. Structural steel primer paint.
 - c. Shrink resistant non-metallic grout.
 - 2. Shop Drawings:
 - a. Prepared under direct supervision of registered professional engineer, including:

- 1) Complete erection drawings, details and schedules for fabrication and shop assembly of members,
 - 2) Details, schedules, procedures and diagrams showing sequence of erection.
 - 3) Shop Drawings to be signed and sealed by a New Jersey licensed Professional Engineer.
 - b. Indicate profiles, spacing and locations of members, including:
 - 1) Fabrication details.
 - 2) Size and weight of members.
 - 3) Location of shop and field connections.
 - 4) Locations and details of anchors, base/bearing plates and leveling plates.
 - 5) Details of holes, cuts, camber and splices.
 - 6) Layout and location of composite shear studs.
 - 7) Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
 - c. Indicate welds by standard AWS A2.1 and A2.4 symbols distinguishing between shop and field welds; and show size, length and type of each weld.
 - d. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorage to be installed as work by other sections.
 - e. Obtain detailed drawings of the Work by other trades including locations and sizes of openings in roofs and the Work requiring holes in structural steel, mounting brackets, and supports attached to the structural steel.
 - f. Submit shop drawings in the phases, to coordinate with requirements of the Work. Identify phasing of the Work in Submittal Schedule as required by General Conditions and Supplementary Conditions.
 3. Test Reports: Submit copies of required quality control test reports and inspections specified including tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.
- B. Submit the following for information only according to Conditions of the Contract and Division 1 Specification Sections. The Architect will review but not approve or disapprove these submittals.
1. Mill Certificates: Provide fabricator's certification that the structural steel furnished for this Project complies with the requirements of the Contract Documents.
 2. Mill Test Reports: Provide certified mill test reports of chemical analysis and physical test for each heat number of structural steel.
 3. Welder's Certificates: Provide welder's certificates for welders employed for this Work, verifying current AWS qualifications.
 4. Galvanized Steel: Certification that steel to be galvanized contains elements within the ranges listed below:
 - a. carbon < 0.25%
 - b. phosphorus < 0.05%
 - c. manganese < 1.35%
 - d. silicon within the range 0 to 0.04% or 0.15 to 0.25%
 5. Qualification Data: Submit fabricator and installer qualifications verify years of successful experience; including list of completed projects with similar scope of work identified by name, location, date, Architect and Structural Engineer and their phone numbers.

- C. Submit certified copies of each survey conducted by a licensed Land Surveyor, showing elevations and locations of base plates and anchor bolts to receive structural steel and final elevations and locations for major members. Indicate discrepancies between actual installation and contract documents.

1.4 PERFORMANCE REQUIREMENTS

- A. Interface with other systems:
 - 1. Coordinate primer with finish paint and fireproofing.
 - 2. Provide templates and instructions for installing anchors in other Work.
- B. Structural Performance: All structural steel connections not indicated on the the Contract Documents shall be designed by the fabricator's Engineer to withstand design loadings indicated or the full capacity of the framing members.
- C. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the latest editions of the following, except as otherwise indicated:
 - 1. AISC Manual of Steel Construction - fourteenth edition (ASD) including the AISC "Code of Standard Practice for Steel Buildings and Bridges-":
 - 2. AISC "Allowable Stress Design Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
 - 3. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
 - 5. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, sheet Piling and Bars for Structural Use".
 - 6. Hot-dip galvanizing fabrication practices: Conform to the requirements of ASTM A143, A384 and A385 unless otherwise specified.
 - 7. SSPC "Steel Structures Painting Manual".
- B. Designer/Engineer Qualifications: Connections not specifically detailed on the Contract Drawings are to be designed under the direct supervision of a Registered Professional Engineer, licensed in the Project jurisdiction, specializing in structural steel engineering.
- C. Installer Qualifications: Minimum of 5 years documented, successful experience with work comparable to the Work of this Project.
- D. Fabricator Qualifications: Company specializing in structural steel fabrication having a minimum of 5 years documented, successful experience with work comparable to the Work of this Project.

- E. Galvanizing Applicator: Company specializing in hot-dip galvanizing after fabrication having a minimum of 5 years documented, successful experience and approved by the manufacturer and/or fabricator.
- F. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
 - 1. Before assigning any welders to work covered by this Section of the specification, the Contractor shall provide the Engineer with certifications that each of these welders has passed qualification tests using AWS procedures. The certifications shall state that each welder shall have been doing satisfactory welding of the required type within the six-month period previous to the subject work. A certification shall be submitted for each welding operator, stating the name of the welder, the name and title of the person conducting the examination, the bend of specimens, the position of welds, the results of tests and the date of examination.
 - 2. If recertification of welders is required during extent of this Project, retesting will be Contractor's responsibility.
- G. Preinstallation Conference: Conduct conference at the Project Site to comply with the requirements of Division 1 Section "Project Meetings".

1.6 CONNECTION DESIGN AND MEMBER DETAILING

- A. Member Detailing and Design of Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site without causing delay in the work.
 - 1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.
- B. Design connections as "Framed Beam Connections: in accordance with Part 4 of the AISC Manual, except as otherwise indicated."
 - 1. For noncomposite beams, reaction shall be end reaction on member, as defined in the AISC "Uniform Loaded Beam Tables", or reaction shown on the Drawings, whichever is greater.
 - 2. Single sided connections for spandrel beams are not acceptable.
 - 3. Bolts: A325 or A490. Connections may be designed using Type N Bolts, except at hanger connections and where slip-critical connections shall be used.
- C. Shop and Field Connections:
 - 1. Shop connections are to be welded unless indicated otherwise on the Drawings.
 - 2. Bolt field connections with high-strength bolts except where welded connections or other connections are indicated.
 - 3. Bolts: 3/4 inch diameter minimum.
 - 4. Fillet welds: 1/4 inch minimum, unless otherwise noted.
- D. Except where seated connections are shown or required, frame beams and girders into columns. Reinforce beam webs at seated connections for stability and to prevent buckling.
- E. Moment Connections:
 - 1. Where a moment connection is noted on plans, provide a moment connection at the beam to column connection or supporting beam to beam framing connection.

2. Unless noted otherwise, the moment connection is to develop the full strength of the beam in bending. Use plates, top and bottom of the beam, to accomplish development.
3. Cantilevers require full moment connections "thru" column or supporting beam, unless beam rides over supporting member or column.
4. For moment connections "thru" columns, add beam stiffener plates minimum 3/8 inches thick. When the beam is parallel to the column web, the stiffener plates are to be equal to the flange thickness of the column and installed in line with the column flanges. When the beam is perpendicular to the column web, the stiffener plates are to be equal to the web thickness and installed in line with the column web. In addition, when beam is perpendicular to the column web, install column cap plate stiffeners equal to the column web thickness. The cap plate stiffeners are to be installed on both sides of the column web in line with the beam web.
5. Where a moment connection is indicated at a beam to beam connection, the supporting beam is to be continuous and a full moment and shear connection provided for the terminated beam.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry or attached to other construction, in ample time to not-delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- D. Do not store materials on the structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 TEMPORARY BRACING

The steel erector/contractor is responsible for the design, strength, adequacy, safety and means and methods of construction of shoring and temporary bracing of Structural Steel Work at all stages of erection, until such time that permanent members and construction are in place and final connections are completed.

1.9 PROJECT CONDITIONS

- A. Field verify all existing measurements and elevations prior to beginning fabrication process. Architect/Engineer will not review or take responsibility for any existing dimensions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness in accordance with the AISC "Specifications for Architecturally Exposed Structural Steel". Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. Wide Flange Shapes: ASTM A 992 or ASTM A572
- C. Structural Steel Shapes, Plates and Bars: ASTM A 36 or ASTM A 572, Grade 50.
- D. Structural Steel Tubing:
 - Cold-Formed: ASTM A 500, Grade B.
 - Hot-Formed: ASTM A501.
- E. Pipe: ASTM A53, Type E or S, Grade B.
- F. Bolts, Nuts, and Washers:
 - 1. Unheaded Rods: ASTM A 36 (ASTM A 36M).
 - 2. Unheaded Rods: ASTM A 572, Grade 50 (ASTM A 572M, Grade 345).
 - 3. Anchor Rods: ASTM A307 or ASTM F 1554, Grade 36 or Grade 55, nonheaded type unless otherwise indicated.
 - 4. Standard threaded fasteners:
 - a. Plain washers: ANSI B27.2, Type A.
 - b. Beveled washers: ANSI B27.4.
 - c. Nuts and bolts: ASTM A307, Grade A.
 - 5. High-Strength Threaded Fasteners: Quenched and tempered medium-carbon steel.
 - a. Bolts: Heavy hexagon ASTM A325.
 - b. Nuts: Heavy hexagon ASTM A563, Grade DH.
 - c. Washers: Hardened ASTM F436.
 - (1) beveled at channel flanges
 - 6. Direct Tension Indicator Fasteners: Load indicator washers to conform to ASTM F959, or tension control bolts may be used.
- G. Electrodes for Welding: Comply with AWS Code.
 - 1. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Structural Steel Primer Paint: Fabricator's standard lead and chromate-free, nanasphaltic, rust-inhibiting primer, except at exterior columns.
 - 1. Where faying surfaces of slip-critical joints are permitted by Architect to be painted, provide Class A paint (providing a minimum slip coefficient of 0.33) in accordance with Test Method to Determine Slip Coefficient for Coatings used in Bolted Joints, in Appendix A of the RCSC Specification for Structural Joints. Manufacturer's certification shall include a certified copy of the test report.
 - 2. At exterior columns to receive spray fireproofing, steel shall be primed with corrosion resistant primer compatible with the spray fireproofing material.

- I. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds and repair painting galvanized steel, complying with Military Specifications DOD-P-21035 (Ships) or SSPC-Paint-20.
- J. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- K. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.
 - 1. Pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives.
 - 2. Products: Subject to compliance with the requirements, provide one of the following:
 - a. Euco N.S. by Euclid Chemical Co.
 - b. Five Star Grout by Five Star Grout Corp.
 - c. Masterflow 713 by Master Builders.
 - d. an approved equal.

2.2 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final approved shop drawings. Provide camber in structural members where indicated.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
- C. Where finishing is required, complete structural steel assemblies, including welding of units, before starting shop-priming of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- D. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded.
- E. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.
- F. Connections:
 - 1. Welded Connections: Comply with AWS D1.1 Code for procedures, appearance and quality of welds and methods used in correcting welding work.
 - a. Join members with continuous welds, except where bolted connections are indicated.
 - b. Stress relieve welded assemblies by heat treatment.
 - c. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
 - d. Grind welds smooth.

3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch and larger. Grind flush butt welds. Dress exposed welds.
3. Bolted connections: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" (RCRBSJ).
 - a. Shear-bearing connections: Bolts in connections not within slip-critical category, nor subject to tension loads, nor required to be fully tensioned bearing type connections shall be installed in properly aligned holes, tightened to snug-tight condition. Snug-tight condition is defined as tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or full effort of a man using an ordinary spud wrench.
- G. Bolt field connections, except where welded connections or other connections are indicated.
 1. Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.
- H. Holes for Bolted Connections and Other Work:
 1. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning.
 3. Drill holes in bearing plates.
 4. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
- I. Masonry Anchors:
 1. Provide anchors welded to steel columns and beams for support of masonry abutting and masonry adjacent to structural steel.
 2. Space anchors 24 inches on center vertically for columns and 32 inches on center horizontally for beams.
 3. Acceptable product: Equivalent to No. 315 by Heckmann Building Products.
 5. Coordinate with Work of Section 04 "UNIT MASONRY" specification in welding channel slots for masonry anchorage to steel.

2.3 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to all exterior exposed structural steel and all other structural steel indicated for galvanizing according to ASTM A 123.
- B. Fabricate structural steel in accordance with Class I, II, or III guidelines as described in AGA's Recommended Details for Galvanized Structures.
- C. Use fabrication practices for products in accordance with applicable portions of ASTM A143, A384 and A385, except as specified herein. Avoid fabrication techniques which could cause distortion or embrittlement of steel.
- D. Consult Architect regarding potential warpage problems or potential handling problems during the galvanizing process which may require modification of design before fabrication proceeds.

- E. Remove welding slag and burrs prior to delivery for galvanizing.
- F. Provide holes and/or lifting lugs to facilitate handling during the galvanizing process that are suitable to Architect and fabricator.
- G. Remove, by blast cleaning or other methods, surface contaminants and coatings which would not be removable by normal chemical cleaning process in galvanizing operation.
- H. Application of Coating:
 - 1. All exterior exposed structural steel shall be galvanized including all exterior wall lintels.
 - 2. Steel members, fabrications and assemblies: Comply with ASTM A123.
 - 3. Bolts, nuts and washers and iron and steel hardware components: Comply with ASTM A153.
 - 4. Coating weight: Conform with paragraph 5.1 or ASTM A123 or Table 1 of ASTM A153, as appropriate.
 - 6. Provide post-galvanizing treatments as recommended by AGA for conditions applicable to Work.

2.4 SHOP FINISH

- A. Shop Painting:
 - 1. General: Shop paint structural prime steel, except those members or portions of members as otherwise specified the following:
 - a. Do not paint surfaces which are to be field welded or high-strength bolted in slip-critical type connections.
 - b. Do not paint members or portions of members which are shown to be embedded in concrete.
 - c. Do not paint surfaces which are shown to receive sprayed-on fireproofing.
 - d. Do not paint top flange surfaces of beams to receive composite metal shear studs.
 - e. Galvanize surfaces.
 - 2. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - a. SP-1 "Solvent Cleaning".
 - b. SP-3 "Power Tool Cleaning".
 - 3. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with Manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.
 - a. Apply 2 coats of paint to surfaces which are inaccessible after assembly and erection. Change color of second coat to distinguish it from first.
 - b. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.

2.5 SHOP QUALITY CONTROL

A. Contractor's Responsibilities:

1. Visual inspection:
 - a. Perform visual inspection of all welds.
 - b. Inspect bolted connections in accordance with AISC Specifications for "Structural Joints Using ASTM A325 or A490 Bolts".
2. Repair all discrepancies in dimensional tolerances of connection assembly and defects requiring corrective procedures.

B. Testing and Inspection Agency Responsibilities:

1. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 - a. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - b. Perform visual inspection of all welds.
 - c. In addition to visual inspection, shop-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
 - (1) Liquid Penetrant Inspection: ASTM E 165.
 - (2) Magnetic Particle Inspection: ASTM E 709; performed on roof pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - (3) Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 - (4) Ultrasonic Inspection: ASTM E 164.
1. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and adjoining construction, and conditions under which Work is to be installed. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements. Do not proceed with Work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies in writing to Architect within 48 hours. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

B. Temporary Shoring and Bracing:

1. The steel structure is a self-supporting steel frame and is dependent upon diaphragm action of the metal roof deck and an attachment to a series of moment frames for stability and for resistance to wind and seismic forces.
2. Provide temporary supports required for stability and for resistance to wind and seismic forces until these elements are complete and are capable of providing this support.
3. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
4. Do not remove temporary members and connections until permanent members are in place, final connections are made and concrete slabs are cured.
5. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

D. Setting Base and Leveling/Bearing Plates:

1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces.
2. Clean bottom surface of base and bearing plates.
3. Set loose and attached base plates and bearing plates for structural members on wedges, shims, or setting nuts, or other adjusting devices.
4. Tighten anchor bolts after supported members are positioned and plumbed.
5. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or leveling/bearing plate prior to packing with grout.
7. Pack non-shrink grout solidly between bearing surfaces and bases or plates so that no voids remain. Comply with grout manufacturer's instructions.

3.3 ERECTION

A. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated.
2. Align and adjust various members forming part of complete frame or structure before permanently fastening.
3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
5. Level and plumb individual members of structure within specified AISC tolerances.
6. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
7. Splice members only where indicated and accepted on final approved shop drawings.
8. Complete field connections prior to loading member.
9. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
10. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
11. Gas Cutting: Do not use gas thermal cutting torches in field during erection for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to the Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

12. Direct Tension Indicator: Bolts shall be installed in all holes of the connection and brought to snug tight condition. All fasteners shall then be tightened, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened fasteners prior to final twist-off or yielding of the control or indicator element of the individual devices. Proper tensioning of the bolts may require more than a single cycle of systematic tightening.
- B. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.
- C. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.
- D. Touch-Up Galvanizing:
 1. Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

3.4 FIELD QUALITY CONTROL

- A. The Owner will engage an independent testing and inspection agency, to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests and state in each report whether test specimens and Work evaluated comply with requirements, and specifically state any deviations therefrom.
 1. Reports:
 - a. Provide daily written reports.
 - b. Describe areas inspected.
 - c. Note problems.
 - d. Describe compliance with Contract Documents.
 - e. Include tests conducted and results.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.
- F. Structural steel erection shall be inspected while the Work is in progress.
 1. Field Bolted Connections: General

- a. The torque of 10 percent of the bolts, but not less than 2 bolts, selected at random in each connection are to be tested with an inspecting wrench calibrated with the job torque.
 - b. Load indicator washers delivered for use in a specific application are to be tested at the job site to demonstrate that they do, in fact, provide a proper indication of bolt tension, and that they are properly used by the bolting crews.
 - c. Bolts together with the load indicator washer plus any other washers required by Specification should be installed in all holes of the connection and the bolts tightened to approximately one-half the specified tension. Only after the initial tightening operation should the bolts be fully tensioned in a systematic manner.
 - d. The use of load indicator washers are to be observed by the inspection agency at the job site and the devices and the installation procedure routinely monitored during the work in progress to assure that the specified procedure is followed.
2. Connections which are not slip-critical or in direct tension:
 - a. Assure that plies of connected elements have been brought into snug contact (usually attained by a few impacts of an impact wrench or full effort of a man using an ordinary spud wrench);
 - b. Assure that washers are used in outer plies of slotted holes or as otherwise required.
 3. Visually inspect field welds for conformance with AWS criteria and the Drawings, except as follows:
 - a. Full penetration welds done in the field shall be inspected by ultrasonic testing.
 4. Inspect metal deck installation, fasteners, openings, etc., for conformance with approved Shop Drawings.
- G. Testing agency shall confirm that the structure is square, plumb and level in accordance with AISC tolerances.

3.5 CONSTRUCTION WASTE MANAGEMENT

- A. The contractor, subcontractors, and their personnel shall follow the procedures and practices for waste separation, collection and transport as defined in the contractor's "Waste Management Plan" as required by Division 01 Section "Construction Waste Management".

END OF SECTION 051200

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Composite floor deck.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for concrete fill.
 - 2. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
 - 3. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Product Certificates: For each type of steel deck, signed by product manufacturer.
- D. Welding certificates.
- E. Field quality-control test and inspection reports.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
- G. Research/Evaluation Reports: For steel deck.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

- B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
- C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
 - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- D. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- E. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Steel Deck:
 - a. ASC Profiles, Inc.
 - b. Canam Steel Corp.;The Canam Manac Group.
 - c. Consolidated Systems, Inc.
 - d. DACS, Inc.
 - e. D-Mac Industries Inc.
 - f. Epic Metals Corporation.
 - g. Marlyn Steel Decks, Inc.
 - h. New Millennium Building Systems, LLC.
 - i. Nucor Corp.; Vulcraft Division.
 - j. Roof Deck, Inc.
 - k. United Steel Deck, Inc.

- l. Valley Joist; Division of EBSCO Industries, Inc.
- m. Verco Manufacturing Co.
- n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 COMPOSITE FLOOR DECK

- A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:
 - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G90 zinc coating.
 - 2. Profile Depth: As Indicated.
 - 3. Design Uncoated-Steel Thickness: As indicated.
 - 4. Span Condition: Three span or more.

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile indicated or as recommended by SDI Publication No. 30 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and sloped recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.
- J. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- K. Galvanizing Repair Paint: ASTM A 780, SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- L. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 5/8" nominal.
 - 2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches apart.
 - 3. Weld Spacing: Space and locate welds as indicated.
 - 4. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches (910 mm), and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches, with end joints as follows:
 1. End Joints: Lapped.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Wood blocking, cants, and nailers.
 - 2. Wood furring and grounds.

1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
 - 1. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Wood-preservative-treated wood.
 - 2. Power-driven fasteners.
 - 3. Powder-actuated fasteners.
 - 4. Expansion anchors.
 - 5. Metal framing anchors.

1.3 QUALITY ASSURANCE

- A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
 - 1. Dimension lumber framing.
 - 2. Miscellaneous lumber.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWP C31 with inorganic boron (SBX).
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all rough carpentry, unless otherwise indicated.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.
 3. Cants.
 4. Furring.
 5. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 1. Mixed southern pine, No. 2 grade; SPIB.
 2. Eastern softwoods, No. 2 Common grade; NeLMA.
 3. Northern species, No. 2 Common grade; NLGA.
 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Power-Driven Fasteners: NES NER-272.

- C. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06100

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
 - 1. Preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.
 - 3. Foam-plastic sheathing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

2.2 WOOD PANEL PRODUCTS

- A. Plywood: DOC PS 2 unless otherwise indicated.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction, Use Category UC3b for exterior construction.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat all plywood unless otherwise indicated.

2.5 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.

2.6 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural I sheathing.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Fix to wood/steel framing.
 - b. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION 061600

SECTION 062023 – INTERIOR CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim.
- B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

- A. Product Data: For solid-surfacing material, cabinet hardware and accessories, and finishing materials and processes.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
 - 1. Wood Trim
- D. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."
 - 1. Provide AWI Quality Certification Program Labels and certificates for woodwork, including installation.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood Species for Opaque Finish: Poplar
- B. Wood Products:
 - 1. Hardboard: AHA A135.4.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD
 - 3. Particleboard: ANSI A208.1, Grade M-2
 - 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
 - 5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP
- C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use Exterior Type or Interior Type A. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Kiln-dry material after treatment.
- B. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 8 Section "Door Hardware (Scheduled by Describing Products)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- E. Catches:
 - 1. Push-in magnetic catches, BHMA A156.9, B03131
 - 2. Roller catches, BHMA A156.9, B03071
- F. Drawer Slides: BHMA A156.9, B05091.
 - 1. Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel with polymer rollers.

2. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
3. Pencil Drawer Slides: Grade 1; for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.

G. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063. – NOT USED

H. Door Locks: BHMA A156.11, E07121. – NOT USED

I. Drawer Locks: BHMA A156.11, E07041.

J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.
2. Satin Stainless Steel: BHMA 630.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant-treated, kiln-dried to less than 15 percent moisture content.

2.5 FABRICATION

A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

1. Interior Woodwork Grade: Premium.
2. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.

B. Interior Standing and Running Trim:

1. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
2. Assemble casings in plant except where limitations of access to place of installation require field assembly.

C. Plastic-Laminate Cabinets:

1. AWI Type of Cabinet Construction: Flush overlay as indicated.
2. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate as follows:
 - a. Horizontal Surfaces Other Than Tops: Grade HGS.
 - b. Postformed Surfaces: Grade HGP.
 - c. Vertical Surfaces: Grade HGS.
 - d. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
3. Materials for Semiexposed Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
4. Drawer Sides and Backs: Thermoset decorative panels.
5. Drawer Bottoms: Thermoset decorative panels.

6. Colors, Patterns, and Finishes: As indicated on drawings
7. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

D. Plastic-Laminate Countertops:

1. High-Pressure Decorative Laminate Grade: HGS.
2. Colors, Patterns, and Finishes: As indicated on drawings
3. Edge Treatment: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.

2.6 SHOP FINISHING

- A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.
- C. Opaque Finish:
 1. Grade: Premium.
 2. AWI Finish System: Catalyzed vinyl.
 3. Color: Match sample.
 4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Scarf running joints and stagger in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.

- G. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim or otherwise indicated.
- H. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with;
 - a. No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips
 - b. No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish
 - c. Toggle bolts through metal backing or metal framing behind wall finish.
- I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

END OF SECTION 06402

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.
 - 3. Foam insulation.
 - 4. Vapor retarders.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Building Products.
 - 2. Type VI, 40 psi (276 kPa).

2.2 GLASS-FIBER BLANKET INSULATION

- 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. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville.

4. Knauf Insulation.
5. Owens Corning.

- B. Unfaced, Glass-Fiber Blanket Insulation: 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.
- C. Polypropylene-Scrim-Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).
- D. Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).
- E. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
- F. Foil-Faced, Glass-Fiber Blanket Insulation: 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.

2.3 FOAM INSULATION

- A. Amino-plast masonry foam insulation two component system comprising amino-plast resin and a catalyst injected into cavity by compressed air.

2.4 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 10 mils (0.25 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- 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. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical surfaces, set insulation units according to manufacturer's written instructions.
- B. Foam Insulation: Apply according to manufacturer's written instructions.

3.3 INSTALLATION OF VAPOR RETARDERS

- A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.
 - 1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
- C. 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.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

END OF SECTION 072100

SECTION 072500 - WEATHER BARRIER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheet applied weather barrier and related accessories for wall air/moisture barrier system.

1.2 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry: Wood framing and bracing.
- B. Section 061600 - Sheathing.
- C. Section 074610 - Siding: Wall finish and primary weather barrier.

1.3 REFERENCES

- A. The American Association of Textile Chemists and Colorists (AATCC) 127 - Water Resistance: Hydrostatic Pressure Test.
- B. American Society for Testing and Materials (ASTM) E-96 - Standard Test Methods for Water Vapor Transmission of Materials.
- C. American Society for Testing and Materials (ASTM) D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
- D. American Society for Testing and Materials (ASTM) D3330 - Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape¹.
- E. American Society for Testing and Materials (ASTM) D3759 - Standard Test Method for Tensile Strength and Elongation of Pressure-Sensitive Tapes.
- F. PSTC-1 - Peel Adhesion of Single Coated Pressure-Sensitive Tapes at 180 Degree Angle.
- G. TAPPI T-460 - Porosity - Gurley.

1.4 SYSTEM DESCRIPTION

- A. The airtight components and secondary moisture protection of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness and moisture barrier of the building enclosure are called "the air/moisture barrier system". Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by the Architect.
- B. Air Barrier Penetrations: All penetrations of the air/moisture barrier and paths of air infiltration / exfiltration through the air/moisture barrier system shall be made air-tight.
- C. Moisture Barrier Penetrations: All penetrations of the air/moisture barrier and paths of water migration through the air/moisture barrier system shall be made water shedding.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation and sealing techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Repair mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Do not store in direct sunlight. Weather barrier shall be stored in a covered area. Do not expose to building site chemicals.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

- A. Anticipate environmental conditions and schedule installation when conditions are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. Product Warranty: Limited product warranty against manufacturing defects.
 - 1. HardieWrap Weather Barrier and related products for 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: [request info \(info@jameshardie.com\)](mailto:request info (info@jameshardie.com)); Web: www.jameshardiecommercial.com or one of the following:
 - 1. Du Pont Tyvek Commercial Wrap
 - 2. Raven Industries Fortress Pro Weather Protective Barrier
 - 3. Or approved equal
- B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 WEATHER BARRIER SYSTEM

- A. Moisture Air Barrier Sheet:
1. Product: HardieWrap Weather Barrier as manufactured by James Hardie Building Systems.
 2. Composition: Non-woven, non-perforated polyolefin.
 3. Film: MicroTech Coating with micropores to balance water holdout and breathability.
 4. Thickness: 11 mil (0.28 mm).
 5. UV Stability: Up to 180 days.
 6. Water Holdout (AATCC127): 128 inches (3250 mm).
 7. Breathability/Water Vapor Permeance (ASTM E-96A): 15 perms.
 8. Air Resistance (TAPPI T-460): >1800 sec/100 cc.
 9. Tear Strength (ASTM D1117): 15 to 18 lb (6.8 to 8.2 kg).
 10. Basis Weight: 19.4 lbs/1000 sf (9.5 kgs/100 sm).
 11. Sizes: 3 feet by 195 feet (914 mm by 59.4 m), 9 feet by 100 feet (2743 mm by 30.5 m), 9 feet by 150 feet (2743 mm by 45.7 m), 10 feet by 100 feet (3048 mm by 30.5 m), 10 feet by 150 feet (3048 mm by 45.7 m).
- B. Self-adhering Flashing: Designed for peel and stick application.
1. Product: HardieWrap Flashing as manufactured by James Hardie Building Systems.
 2. Composition: Butyl rubber adhesive non-woven polyolefin backing; coated Kraft paper release.
 3. Total Thickness: 25 mil (0.64 mm).
 4. UV Stability: Up to 180 days.
 5. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
 6. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
 7. Packaging: Individually shrink-wrapped.
 8. Roll Weight: 4 inch (102 mm) = 4.6 lb (2 kg)/roll, 6 inches (152 mm) = 6.9 lb (3 kg)/roll, 9 inches (229 mm) = 9.9 lb (4.5 kg)/roll.
 9. Provide Width for Application Required: 4 inches by 100 feet (102 mm by 30.5 m) (2x4 construction), 6 inches by 100 feet (152 mm by 30.5 m) (2x4 construction), 9 inches by 100 feet (229 mm by 30.5 m) (2x6 construction).
- C. Flexible Flashing:
1. Product: HardieWrap Flex Flashing as manufactured by James Hardie Building Systems.
 2. Composition: Butyl rubber adhesive; creped cross-laminated polyolefin backing; polyethylene film release.
 3. Total Thickness: 60 mil (1.5 mm).
 4. Tensile Strength (ASTM D3759): 18 lb/inch (3.2kg/cm).
 5. UV Stability: Up to 180 days.
 6. Water Vapor Transfer Rate (ASTM E96-94): <.2g/100 square inches/24hrs.
 7. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
 8. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
 9. Packaging: Each roll is packed in a convenient dispenser box
 10. Roll Weight: 6 inches (152 mm) = 22.2 lb (10kg)/roll, 9 inches (229 mm) = 33.3 lb (15 kg)/roll.
 11. Provide Width for Application Required: 6 inches by 75 feet (152 mm by 23.9 m) (2x4 construction), 9 inches by 75 feet (229 mm by 23.9 m) (2x6 construction).
- D. Seam Tape:
1. HardieWrap Seam Tape as manufactured by James Hardie Building Systems.
 2. Composition: Polypropylene film coated with acrylic adhesive Total Thickness: 3.0 mil (.08 mm).
 3. Adhesion Peel to HardieWrap (PSTC-1): 22 oz/inch (25 N/100 mm).
 4. Tensile Strength (ASTM D3759): 32 lb/in (.58 kg/mm).

5. Elongation: 136 percent.
6. UV Stability: Up to 90 days.
7. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
8. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
9. Packaging: Individually shrink-wrapped.
10. Roll Weight: 1 lb(0.5 kg)/roll.
11. Roll Size: 1-7/8 inches (43 mm) by 165 feet (50 m).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Weather barrier shall be installed before window and door installation. Do not install on saturated sheathing. Weather barrier can become slippery and should not be used in any application where it may be walked on.
- D. Weather barrier shall be installed on vertical wall applications only.
- E. Manufacturer warrants weather barrier sheet only when covered within 180 days of its installation.

3.3 INSTALLATION

- A. Moisture Air Barrier Sheet:
 1. Weather barrier shall be installed before window and door installation. Do not install on saturated sheathing. Weather barrier can become slippery and should not be used in any application where it may be walked on.
 2. Begin by affixing weather barrier extending at least 6 inches (152 mm) around a building corner. Unroll horizontally (with print side facing out) around the building covering rough window and door openings.
 3. Fasten to studs or nailable sheathing material with galvanized construction grade staples a maximum of 18 inches (457 mm) in the vertical and horizontal direction.
 4. Attach weather barrier so that it is taut and flat. The vertical overlap shall have a minimum of 6 inches (152 mm) and the vertical seam shall be taped.
 5. Assure that the bottom edge of the weather barrier extends over the sill plate and foundation interface by at least 1 inch (25 mm).
 6. Overlap upper layers of weather barrier (in shingle lap fashion) by a minimum of 6 inches below the horizontal edge, and tape the horizontal seam line.
 7. At roof to wall intersection (or wall to deck), affix wrap to the wall such that it overlaps any step flashing already in place on the wall by at least 2 inches (51 mm).
- B. Flexible Flashing:
 1. Windows and Doors: Weather barrier is not designed nor guaranteed as a flashing material to prevent moisture or air from intruding behind weather barrier. Verify that flashing has previously been installed around all windows and door openings. Install flexible flashing per manufacturer's instructions.

- a. Use the inverted "Y" cut method at rough window and door openings. Do not place fasteners within 9 inches (229 mm) of the rough opening, door or window heads. This area shall not be fastened to allow for proper head flashing installation. At the top corners of the rough opening, cut the weather barrier at 45 degree to extend 9 inches (229 mm) past the joint.
- b. Fold the top flap up and out of the way and fasten temporarily.
- c. Fold the remaining three flaps in through the opening fastening them inside the opening with staples.
- 2. Rough Electrical and Plumbing Penetrations: Seal with a double layer of flashing. Install the top flashing piece over the bottom flashing piece overlapping flashing layers to cover flashing cut-out necessary for placement around penetration.
- C. Repairs: For minor punctures or tears, less than 3 inches (76 mm), cover and completely seal with seam tape. For larger holes, greater than 3 inches (76 mm), use slit flashing technique.
 - a. Slit flashing requires making a horizontal slit above the damaged area and placing a cut piece of weather barrier into the slit, covering the damaged area. Tape the perimeter of the patched area.

3.4 PROTECTION

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

END OF SECTION 072500

SECTION 072729 - AIR-BARRIER COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes Vapor-retarding air-barrier coatings.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Include details for substrate joints and cracks, counterflashing, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- 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. Include junction with roofing membrane, building corner condition, and foundation wall intersection.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.
- B. Low-Emitting Materials: Air barriers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. 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.

2.3 VAPOR-RETARDING, AIR-BARRIER COATING

- A. Vapor-Retarding, Air-Barrier Coating: Synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Protective Coatings Technology, Inc.; Poly-Wall Airloc Flex.
 - b. Sto Corp.; VaporSeal in [two-] [three-]component assembly.
 - c. Or equal
 - 2. 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] <Insert number> percent; ASTM D 412, Die C.
 - d. Die C.

2.4 ACCESSORY MATERIALS VAPOR-PERMEABLE, AIR-BARRIER COATING

- A. Vapor-Permeable, Air-Barrier Coating: Synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Prosoco, Inc.; R-Guard Spray Wrap in two-component, System II assembly.
 - b. Protective Coatings Technology, Inc.; Poly-Wall Airloc Flex VP.
 - c. Sto Corp.; Emerald Coat or Gold Coat in two-component assembly.

2. 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.

2.5 Ultimate Elongation: Minimum 500 percent; ASTM D 412,

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. 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.
- C. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- B. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- C. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- D. 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.

3.2 INSTALLATION

- A. General: Install air-barrier coating 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 air-barrier assembly 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 air barrier to substrate with termination mastic.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transitions and flashing 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.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal air-barrier assembly around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Extend patches 6 inches (150 mm) beyond repaired areas in strip direction.
- J. Air-Barrier Coating Material: Apply 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 17-mil (0.4-mm) dry film thickness , applied in one coat.
 2. Apply additional coats as needed to achieve void- and pinhole-free surface.
- K. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- L. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. 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.
 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.
- C. 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.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. 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] [60] <Insert number> 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.
- F. Remove masking materials after installation.

END OF SECTION 072729

SECTION 074213 - ALUMINUM METAL PLATE WALL PANELS

PART 1 - GENERAL

1.1.1.1 SECTION INCLUDES

- A. Aluminum metal plate wall panels

1.1.1.2 RELATED REQUIREMENTS

- A. Section 061000 – Rough Carpentry: Plywood substrate sheathing
- B. Section 072500 – Weather Barriers: Air and moisture barrier required as part of metal wall panel assembly.
- C. Section 076200 – Sheet Metal Flashing and Trim: Field formed flashings and other sheet metal work.
- D. Section 079200 – Joint Sealants: Perimeter sealant.

1.1.1.3 DEFINITION

- A. Metal Plate Wall Panel Assembly: Metal plate wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weather tight wall system based on AAMA CW-RS-1.

1.1.1.4 REFERENCE STANDARDS

- A. AAMA - American Architectural Manufacturers Association (www.aamanet.org)
 - 1. AAMA CW-RS-1 – The Rain Screen Principle and Pressure Equalized Wall Design; 2012
 - 2. AAMA 501.1 – Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2005
 - 3. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2009
 - 4. AAMA 508 – Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems; 2014 [Testing based on 2007 Edition]
 - 5. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013 [Testing based on 2005 Edition]
- B. ASTM International (American Society for Testing and Materials; www.astm.org)
 - 1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011
 - 2. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015
 - 3. ASTM D523 - Standard Test Method for Specular Gloss; 2014
 - 4. ASTM D2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2015
 - 5. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011
 - 6. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 07(2015)
 - 7. ASTM E8/E8M - Standard Test Methods for Tension Testing of Metallic Materials; 2013a
 - 8. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 04(2012)
 - 9. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014
 - 10. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 00(2009)

11. ASTM E1233/E1233M – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential; 2014 [Testing based on 2006 Edition]
- C. LEED – Leadership in Energy and Environmental Design
- D. NAAMM – National Association of Architectural Metal Manufacturers
- E. SMACNA – Sheet Metal and Air Conditioning Contractor's National Association
- F. PS - Voluntary Product Standard; National Institute of Standards and Technology (NIST)
 1. PS-1 – Structural Plywood; 2009

1.1.1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate panel assemblies with rain drainage, flashing, and other adjoining work.
- B. Preinstallation Meeting:
 1. Attendees:
 - a. Owner.
 - b. Architect.
 - c. Installer.
 - d. Panel manufacturer's representative.
 - e. Structural support installer's.
 - f. Installer's whose work interfaces with or affects wall panels including installers of doors, windows, and louvers.
 2. Review and finalize construction schedule.
 3. Verify availability of materials, installer's personnel, equipment, and facilities needed to maintain schedule.
 4. Review means and methods related to installation, including manufacturer's written instructions.
 5. Examine support conditions for compliance with requirements, including alignment and attachment to structural members.
 6. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affects this Work.
 7. Review temporary protection requirements for during and after installation of this Work.

1.1.1.6 SUBMITTALS

- A. See Section 013000 – Submittals, for procedures.
- B. Product Data: Submit for each type of product indicated, include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal plate wall panel and accessory.
- C. Shop Drawings: Submit fabrication and installation layouts of metal plate wall panels; including details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 1. Provide distinction between factory-assembled, shop-assembled, and field-assembled work.
 2. Provide details of following items at full scale.
 - a. Manufacturer's standard sheet metal trims.
 - b. Components of wall panel construction, anchorage methods, and hardware.
- D. Coordination Drawings: Submit exterior elevations, drawn to scale, that have the following items shown and coordinated with each other, using input from installers of the following items:
 1. Metal plate wall panels and attachments.
 2. Girts.
 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 4. Penetrations of wall by pipes and utilities.
- E. Samples: Submit for each type of exposed finish required, and prepared on samples of size as follows:

1. Aluminum Metal Plate Wall Panels: At least 2 inch by 3 inch.
- F. Test and Inspection Reports: Submit test and inspection reports on each type of wall panel system provided for project based on evaluation of comprehensive tests performed by qualified testing agency.
- G. Maintenance Data: Submit maintenance data for metal plate wall panels.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.1.1.7 QUALITY ASSURANCE

- A. Installer: Company specializing in performing work of this section and approved by manufacturer.
 1. Install system in strict compliance with manufacturer's installation instructions.
- B. Source Limitations: Obtain each type of metal plate wall panel from single source and from single manufacturer.

1.1.1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store materials in clean, dry, interior area in accordance with manufacturer's instructions.
- C. Deliver panels, components, and other manufactured items without damage or deformation.
- D. Protect panels during transportation, handling, and installation from weather, excessive temperatures and construction operations.
- E. Handle panels in strict compliance with manufacturer's instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface damage.
 1. Store panels vertically with top of panel down, storage of panels horizontally is not permitted.
- F. Store panels covered with suitable weather tight and ventilated covering.
- G. Provide storage of panels to ensure dryness, with positive slope for drainage of moisture.
- H. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- I. Remove strippable protective covering from aluminum panel prior to installation.

1.1.1.9 SITE CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before panel fabrication and indicate measurements on Shop Drawings.
 1. Coordinate with construction schedule.

1.1.1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

- B. Wall System Warranty: Provide wall panel manufacturer warranty, agreeing to correct defects in manufacturing of materials within a one year period after Date of Substantial Completion.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration: Beyond normal weathering of wall system metals and other materials.
- C. Panel Material Warranty: Provide panel material manufacturer warranty, agreeing to repair finish of metal plate wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from Date of Substantial Completion.
 - 2. Warranty Coverage: In accordance with AAMA 2605 for 70 percent PVDF resin on aluminum finish requirements.
 - a. Fading, Loss of Color Retention: Loss of 5 Delta E units (Hunter) or less, in accordance with ASTM D2244.
 - b. Chalking, Chalky White Powder on Panel Surface: Chalking at No. 8 or less for colors, or No. 6 for white, in accordance with ASTM D4214.
 - c. Loss of Adhesion: Loss of 10 percent due to cracking, checking or peeling, or failure to adhere to bare metal.
 - d. Gloss Retention: 50 percent or less in accordance with ASTM D523.
 - e. Salt Spray, Accelerated: At least 4,000 hours in accordance with ASTM B117.
 - f. Humidity Testing, Accelerated: At least 4,000 hours in accordance with ASTM D2247.

PART 2 - PRODUCTS

2.1.1.1 MANUFACTURERS

- A. EN-V – Aluminum Wall Panel System.
 - 1. Address: 12480 Superior Ct., Holland, Michigan 49424.
 - 2. P.O. Box 1286 Holland, Michigan 49422-1286.
 - 3. Phone: (616) 355-2970; Fax: (616) 355-2972; Website: www.en-v.com; or provide products by one of the following:
 - 1. Dri- Design: Architectural Wall Panels & Systems
 - 2. AEP SPAN- Architectural Metal Wall Products
 - 3. Or approved equal

2.1.1.2 PERFORMANCE REQUIREMENTS

- A. Metal Plate Wall Panel Assemblies: Comply with performance requirements without failure due to defective manufacturing, fabrication, installation, or other construction defects.
- B. Design, fabricate, and erect a dry joint, pressure equalized rainscreen aluminum wall panel system without use of sealants, gaskets, or butyl tape, tested as installed in compliance with AAMA 508, and as follows:
 - 1. Cyclic Static Air Pressure Differential: Pass cycled pressure loading at 25 psf in 100 three-second cycles in accordance with ASTM E1233/E1233M.
 - 2. Air Infiltration: Pass when tested at 1.57 psf (25 mph) in accordance with ASTM E283.
 - 3. Water Penetration:
 - a. Static: Pass water penetration test under 25.0 psf positive static air pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with ASTM E331.
 - b. Dynamic: Pass water penetration test under 15.0 psf dynamic pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with AAMA 501.1.
 - 4. Structural: Provide systems tested in accordance with ASTM E330/E330M and certified to be without permanent deformation or failure of structural members.

2.1.1.3 MATERIALS

- A. Aluminum Plate: Alloy and temper as recommended by manufacturer for application and in compliance with manufacturers design requirements.
 - 1. Aluminum Material: Tension-leveled, flouropolymer PVDF painted finish, 3003-H14 manganese alloy] or [Thickness: 0.080 inch.
 - 2. Weight: Less than 2 lbs per sf.
 - 3. Finish: Two-Coat Fluoropolymer.
- B. Panel Depth: 1-1/4 inch, nominal.
- C. Panel Size: As selected from list of standard sizes.

2.1.1.4 FABRICATION

- A. Fabricate and finish wall panels within manufacturer's facilities and fulfill indicated performance requirements demonstrated by laboratory testing.
 - 1. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication and ensure exposed edges are coated.

2.1.1.5 FINISHES

- A. Comply with NAAMM's - Metal Finishes Manual for Architectural and Metal Products, for recommendations of designating finishes.
- B. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) resin system.
 - 1. Two-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
 - 2. Two-Coat Mica Fluoropolymer: AAMA 2605, fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
- C. Field Touch-Up Materials: As recommended by coating manufacturer for field application.

2.1.1.6 ACCESSORIES

- A. Metal Plate Wall Panel Accessories: Provide components required for a complete metal plate wall panel assembly including trim, copings, fascia, mullions, sills, corner units, flashings, and similar items. Match material and finish of panels unless otherwise indicated.
- B. Provide integral drainage system and manufactures standard extrusions at termination of dissimilar materials.
- C. Flashing and Trim: Match material, finish, and color of adjacent wall panels.
 - 1. Thickness: At least 0.040 inch.
 - 2. Refer to Section 076200.
- D. Panel Fasteners: Designed to withstand design loads, with at least 7/16 inch diameter head and neoprene washer.
 - 1. Aluminum Wall Panel Material: Provide stainless steel fasteners, or coated fastener approved by panel manufacturer or project wall consultant.
- E. Sub-Girts: Galvanized, provide size and gage in accordance with project requirements.
 - 1. Furring Channel: Provide Hat, C, U or Z type as recommended by manufacturer.
 - 2. Flat Strap: At least 14 gage, 0.0747 inch (1.90 mm) thick.

- F. Substrate Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I, at least 5/8 inch thick.
 - 1. Refer to Drawings and Section 061000 for requirements.
- G. Weather Barriers: Provide climate specific weather barrier with performance characteristics for air penetration, water vapor transmission, and water penetration resistance.
 - 1. Refer to Section 072500 for requirements.
- H. Sealants: As recommended by metal panel manufacturer for openings within wall panels and perimeter conditions.
 - 1. Refer to Section 079200 for requirements.

PART 3 - EXECUTION

3.1.1.1 EXAMINATION

- A. Examine substrates, and Work areas and conditions with Installer present for compliance with requirements for installation tolerances, wall panel supports, and other conditions affecting performance of this Work.
- B. Examine wall framing to verify that girts, angles, channels, studs, and other structural wall panel support members and anchorage have been installed within alignment tolerances required by wall panel manufacturer.
- C. Verify that weather barrier has been installed over sheathing or substrate to prevent air infiltration or water penetration.
- D. Examine rough-in for components and systems penetrating wall panels to coordinate actual penetration locations relative to wall panel joint locations prior to installation.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1.1.2 PREPARATION

- A. Miscellaneous Framing: Install sub girt, base angles, sills, furring, and other wall panel support members and provide anchorage in accordance with ASTM C754 for gypsum panel type substrates and panel manufacturer's installation instructions.

3.1.1.3 INSTALLATION

- A. Install wall panels in accordance with manufacturer's installation instructions, including pressure equalized rainscreen installation method and installation guidelines.
 - 1. Wall panels consist of single sheets of metal formed with interlocking gutter and drainage system integral to the panel with single horizontal attachment for dry-joint rainscreen assembly.
 - 2. Use of secondary drainage channels, brackets, support pins, joint sealants or gaskets to manage the drainage of wall panel system is not permitted.
 - 3. Attach wall panels using progressive interlocking method, engaging bottom of panel in top of previous panel working bottom up, and left to right.
 - 4. Install wall panels with single top attachment in pre-punched holes to allow individual panels to move due to thermal expansion.
 - 5. Do not compromise internal gutter.
- B. Install wall panels for orientation, sizes, and locations as indicated on Drawings.
- C. Install wall panels with proper anchorage and other components for this Work securely in place.
- D. Install wall panels with provisions for thermal and structural movement.
- E. Install shims to plumb substrates as necessary for installation of wall panels.

- F. Install weather tight seals at perimeter of wall panel openings.
 - 1. Test for proper adhesion on small unexposed area of solid surfacing prior to use.
 - 1. Refer to Section 07 9200.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA - Architectural Sheet Metal Manual.
 - 1. Provide concealed fasteners where possible, and set units true to line and level as indicated.
 - 2. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 3. Install flashing and trim as wall panel Work proceeds.
- H. Install weather tight escutcheons for pipe and conduit penetrating exterior walls.
- I. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by wall panel manufacturer.
- J. Install attachment system to support wall panels and with provisions to provide a complete weather tight wall system, including sub girts, extrusions, flashings and trim.
 - 1. Include attachment to supports and trims at locations using dissimilar materials.
 - 2. Do not apply sealants to joints, unless noted otherwise on Drawings or Shop Drawings.
 - 3. Install starter extrusion at base course and at cut panel locations.
- K. Install accessories with positive anchorage to building and weather tight mounting and provisions for thermal expansion, and coordinate installation with flashings and other components.
 - 1. Install components required for a complete wall panel assembly including trim, copings, flashings and other accessory items.
- L. Weather Barrier: Install weather barrier behind wall panels and over substrate in accordance with requirements of Section 07 2500.

3.1.1.4 TOLERANCES

- A. Shim and align wall panel units with installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated.

3.1.1.5 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor to engage a qualified independent testing agency to perform field tests and inspections.
- B. Water-Spray Test: After installation and in coordination with Mockup requirements, test area of assembly [shown on Drawings] [as directed by Architect] or <Insert area> for water penetration in accordance with AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- E. Perform additional tests and inspections, at Contractor's expense, to verify compliance of replaced wall panels or necessary additional work with specified requirements.
- F. Prepare test and inspection reports.

3.1.1.6 CLEANING

- A. Upon completion of wall panel installation, clean finished surfaces as recommended by panel manufacturer.

- B. Upon completion of wall panel installation, clear weep holes and drainage channels of obstructions and dirt.

3.1.1.7 PROTECTION

- A. Protect installed products from damage during subsequent construction.
- B. Replace wall panels damaged or deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213

SECTION 075216.13 - SBS MODIFIED BITUMINOUS MEMBRANE ROOFING, COLD-APPLIED

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing system on concrete deck, including but not limited to:
 - a. Roof insulation.
 - b. Roof insulation cover board.
 - c. SBS-modified bituminous membrane roofing.
 - d. Granule-surfaced SBS-modified bituminous membrane cap sheet.

1.2 DEFINITIONS

- A. Roofing Terminology:** Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review drawings and specifications.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.

6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastening spacings and patterns for mechanically fastened components.
 1. Base flashings and built-up terminations.
 - a. Indicate details meet requirements of NRCA and FMG required by this Section.
 2. Tapered insulation, including slopes.
 3. Crickets, saddles, and tapered edge strips, including slopes.
 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 5. Membrane fastening or adhesion requirements.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 1. Include letter from Manufacturer written for this Project indicating approval of Installer.

- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of compliance with performance requirements.
 - 2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives and sealants.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Field Quality Control Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions required and carried out.
 - 1. Submit reports within 48 hours after inspection.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer with UL listed roofing systems comparable to those specified for this Project, with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.
 - 1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.

- b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner contact information.
 - e. Sample warranty.
 - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
- 1. An authorized full-time technical employee of the manufacturer.
 - 2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT / FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
 - 1. Form of Warranty: Manufacturer's standard warranty form.
 - 2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
 - 3. Warranty Period: 25 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, 15 and 20 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.

1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
2. Scope of Warranty: Work of this Section.
3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or approved equal products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures calculated in accordance with ASCE-7 and applicable code.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to ANSI/SPRI ES-1.
- D. Roofing Membrane System Load-Strain Properties: Provide a roofing membrane identical to component systems that have been successfully tested by a qualified independent testing and inspecting agency to meet the following typical load-strain properties at membrane failure when tested according to ASTM D2523/D2523M:

1. Tensile strain at failure, at 0 deg. F (-18 deg. C), machine direction: Not less than 610 lbf/in., machine direction; and not more than 1.85 percent elongation.
 2. Tensile strain at failure, at 0 deg. F (-18 deg. C), cross-machine direction: Not less than 595 lbf/sq. ft., cross-machine direction; and not more than 2.35 percent elongation.
- E. Flashings and Fastening: Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
1. FM Global 1-49: Loss Prevention Data Sheet for Perimeter Flashings.
 2. FM Global 1-29: Loss Prevention Data Sheet for Above Deck Roof Components.
 3. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 4. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
 5. Comply with requirements of Division 07 Section "Sheet Metal Flashing and Trim" and "Roof Specialties".
- F. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 ROOFING MEMBRANE MATERIALS

- A. SBS Modified Bituminous Membrane Smooth-Surfaced Sheets:
1. SBS-modified asphalt coated composite polyester / fiberglass/fiberglass mat reinforced high tensile strength base sheet, ASTM D4601 Type II.
 - a. Basis of design product: Tremco, BURmastic Composite Ply HT.
 - b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 165 lbf/in (725 N); Cross machine direction, 150 lbf/in (660 N).
 - c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 260 lbf (1150 N); Cross machine direction, 230 lbf (1120 N).

- d. Thickness, minimum, ASTM D5147: 0.060 inch (1.5 mm).

B. SBS Modified Bituminous Membrane Granular-Surfaced Cap Sheet:

- 1. SBS/RET/Urethane-modified asphalt-coated composite polyester and glass-fiber-reinforced high-tensile strength sheet, white granular surfaced; ASTM D6162 Grade G Type III.
 - a. Basis of design product: Tremco, POWERply Endure 300 FR.
 - b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 345 lbf/in (60 kN/m); Cross machine direction 340 lbf/in (60 kN/m).
 - c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 600 lbf (2665 N); Cross machine direction 580 lbf (2575 N).
 - d. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 12 percent; Cross machine direction 8 percent.
 - e. Low Temperature Flex, maximum, ASTM D5147: -40 deg. F (-40 deg. C).
 - f. Thickness, minimum, ASTM D5147: 0.145 inch (3.7 mm) .

C. Flashing Backer Sheet:

- 1. Same product as ply sheet.

D. Flashing Sheet:

- 1. Same product as cap sheet.

E. Detail Fabric:

- 1. Woven Glass Fiber Mesh, Vinyl-Coated: Non-shrinking, non-rotting, vinyl-coated woven glass mesh for reinforcing flashing seams, membrane laps, and other roof system detailing.
 - a. Basis of design product: Tremco, BURmesh.
 - b. Tensile strength, 70 deg. F, min ASTM D146: Warp, 65 lbf/in (285 N); fill, 75 lbf/in (310 N).
 - c. Color: Aqua green.

2.5 COLD-APPLIED ADHESIVE MATERIALS

- A. General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Modified Bituminous Interply and Cap Sheet Adhesive:
 - 1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.
 - a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.
 - c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).
 - d. Solids, by Volume, ASTM D2697: 100 percent.
 - e. Biobase Content, Minimum, ASTM D6866: 70 percent.
- C. Flashing Sheet Adhesive: and Flashing Backer
 - 1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.
 - a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.
 - c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).
 - d. Solids, by Volume, ASTM D2697: 100 percent.
 - e. Biobase Content, Minimum, ASTM D6866: 70 percent.
- D. Asphalt Primer:
 - 1. Asphalt primer, water-based, polymer modified.

- a. Basis of design product: Tremco, TREMprime WB.
- b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 2 g/L.
- c. Color: Brown/black.

2.6 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
- B. Stripping Adhesive / Sealer:
 - 1. Seam Sealer: Aromatic polyurethane sealer, single-component, high solids, moisture curing, formulated for compatibility and use with a variety of roofing and flashing substrates.
 - a. Basis of design product: Tremco, GEOGARD Seam Sealer.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 189 g/L.
 - c. Tensile Strength, ASTM D412: 270 psi (1860 kPa).
 - d. Tear Strength, ASTM D412: 35 pli (6.13 kNm).
 - e. Elongation, ASTM D412: 220 percent.
 - f. Color: Gray.
- C. Stripping Reinforcing Fabric:
 - 1. Woven Glass Fiber Mesh, Vinyl-Coated: Non-shrinking, non-rotting, vinyl-coated woven glass mesh for reinforcing flashing seams, membrane laps, and other roof system detailing.
 - a. Basis of design product: Tremco, BURmesh.
 - b. Tensile strength, 70 deg. F, min ASTM D146: Warp, 65 lbf/in (285 N); fill, 75 lbf/in (310 N).
 - c. Color: Aqua green.
- D. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - c. Hardness, Shore A, ASTM C661: 40.
 - d. Adhesion to Concrete, ASTM C794: 35 pli.
 - e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
 - f. Color: Closest match to substrate.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- F. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
- G. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.7 ROOF INSULATION MATERIALS

- A. Roof Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
 1. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.
 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, not less than two times the roof slope.
- B. Roof Insulation:
 1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.

- a. Basis of design product: Tremco, Trisotech Insulation.
- b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
- c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.

2.8 ROOF INSULATION ACCESSORIES

A. Insulation Cover Board:

- 1. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.

- a. Basis of design product: Tremco/USG Securock.
- b. Thickness: 1/4 inch (6mm).

B. Roof Insulation Adhesive:

- 1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.
 - a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
 - b. Flame Spread Index, ASTM E84: 10.
 - c. Smoke Developed Index, ASTM E84: 30.
 - d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
 - e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
 - f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
 - g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

C. Insulation Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

D. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

E. Substrate Joint Tape: 6- or 8-inch- (150- or 200-mm-) wide, coated, glass fiber.

- F. Insulation Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Steel Roof Deck:
 - a. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Verify that substrate is sound and dry.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions, approved shop drawings, and Contract Documents.

- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing
- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system, if applicable.

3.4 ROOFING INSTALLATION DETAILS

- A. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

3.5 INSULATION INSTALLATION

- A. Comply with roofing manufacturer's written instructions for installing roof insulation.
- B. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday
- C. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- D. Tapered Insulation and Crickets: Install tapered insulation under area of roofing to conform to slopes indicated.
 - 1. Where crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope.
- E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- F. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (70 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
 - 1. Tapered Insulation System for Flat Roof Deck: Install insulation as follows:

- a. Minimum total thickness of Continuous Insulation: 5.2 inches.
 - 1) Minimum thickness of base layer: 2.6 inches.
 - 2) Minimum thickness of each subsequent layer: 2.6 inches.
 - b. Continuous Insulation R-value: Not less than 30.
2. Insulation Drain Sumps: Tapered insulation sumps, not less than 2 by 2 ft. (600 by 600 mm), sloped to roof drain; sump to maximum depth of not more than 1 inch (25 mm) less than the Project-stipulated continuous insulation thickness based upon code requirements.
- G. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- H. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- I. Mechanically Fastened and Adhered Insulation Application Method: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
- 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
- J. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together. Tape joints if required by roofing manufacturer.
- 1. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover in place.
- 3.6 COLD-APPLIED ROOFING MEMBRANE INSTALLATION, GENERAL
- A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in NRCA's "Quality Control and Quality-assurance Guidelines for the Application of Membrane Roofing" and as follows:
- 1. Number of Smooth-Surfaced SBS-Modified Asphalt Sheets: Two.

- a. Adhering Method: Cold-adhesive applied.
 2. Granular-Surfaced SBS-Modified Asphalt Cap Sheet:
 - a. Adhering Method: Cold-adhesive applied.
 - B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
 - C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.
 - D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in compatible roofing cement/mastic, with joints and edges sealed.
 - a. Comply with roofing membrane manufacturer's instructions and details for waterstop/daily tie-in; utilize staggered layout and unadhered, removable "deadman" insulation boards.
 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 3. Remove temporary plugs from roof drains at end of each day.
 4. Remove and discard temporary seals before beginning work on adjoining roofing.
 - E. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.
- 3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION
- A. Install modified bituminous roofing membrane ply sheet(s) and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.

2. Embed each sheet in cold-applied membrane adhesive applied at rate required by roofing manufacturer.
- B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Install roofing membrane sheets so side and end laps shed water. Completely bond and seal laps, leaving no voids.
1. Repair tears and voids in laps and lapped seams not completely sealed.
 2. Granular Cap Sheet Laps: Apply roofing granules to cover exuded bead at laps.

3.8 HEAT-WELDING CAP SHEET SEAMS

- A. Cap Sheet Seam Heat-Welding: Prepare and weld seams according to roofing manufacturer's written instructions.
1. Clean minimum 4 inch (102 mm) wide seam area on both surfaces to be joined. Remove debris and contaminants. Allow seam to thoroughly dry prior to performing welding.
 2. Continuously weld 4 inch (102 mm) wide seam using roofing manufacturer's recommended automatic heat welding machine or hand-held heat gun. Roll seam with minimum 75 lb. (34 kg) steel roller.

3.9 FLASHING AND STRIPPING INSTALLATION

- A. Base Flashing Installation, General: Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:
1. Extend base flashing up walls or parapets a minimum of 12 inches (300 mm) above modified bituminous roofing and 6 inches (150 mm) onto field of built-up roofing.
 2. Prime substrates with primer if required by roofing system manufacturer.
- B. Backer Sheet Installation: Apply backer sheet to substrate as follows:
1. Adhere backer sheet to substrate in cold-applied flashing sheet adhesive.
- C. Flashing Sheet Installation: Adhere flashing sheet to substrate in cold-applied adhesive. Apply cold-applied flashing sheet adhesive to back of flashing sheet if recommended by roofing manufacturer.

1. Flashing Sheet Top Termination: Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - a. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.
2. Flashing Sheet Bottom Termination: Adhere flashing sheet to roofing membrane in continuous bed of cold-applied adhesive.
 - a. Bituminous Flashing: Seal bottom termination of base flashing by adhering to roofing membrane and stripping flashing to membrane joint.
- D. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.
- E. Install stripping, according to roofing manufacturer's written instructions, where metal flanges and edgings are set on modified bituminous membrane roofing.
- F. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of compatible mastic/adhesive sealer, as recommended by roofing manufacturer, and extend onto roofing membrane. Apply number of courses recommended by manufacturer.
- G. Roof Drains: Set 30 by 30 inch (760 by 760 mm) square metal flashing in bed of compatible mastic/adhesive sealer on completed roofing membrane. Cover metal flashing with roofing membrane cap sheet stripping and extend a minimum of 6 inches (150 mm) beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 1. Install stripping according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.
 1. Engage a qualified roofing inspector for a minimum of 3 full-time days on site, per 40-hour crew week, to perform roof tests and inspections and to prepare start up, interim and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in NRCA's "Quality Control and Quality-assurance Guidelines for the Application of Membrane Roofing Systems."
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.
1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075216.13

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed low-slope roof sheet metal fabrications.
 - 2. Formed steep-slope roof sheet metal fabrications.
 - 3. Formed wall sheet metal fabrications.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Distinguish between shop- and field-assembled work.
 - 3. Include identification of finish for each item.
 - 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.
- C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- B. Mockups: Build mockups to verify selections made under Sample submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 1. Build mockup of typical roof edge, including built-in gutter fascia trim, approximately 10 feet (3.0 m) long.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install [copings] [roof edge flashings] tested according to SPRI ES-1 and capable of resisting the following design pressure:
 1. Design Pressure: As indicated on Drawings.
- E. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
1. As-Milled Finish: Standard two-side bright.
 2. Alclad Finish: Metallurgically bonded surfacing alloy on both sides, forming aluminum sheet with reflective luster.
 3. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil (0.005 mm).
 4. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 5. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - a. Color: A selected by Architect from manufacturer's full range.
 6. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
 7. Color: As selected by Architect from manufacturer's full range.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; 4 polished directional satin finish.
- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275); prepainted by coil-coating process to comply with ASTM A 755/A 755M.
1. Surface: Manufacturer's standard clear acrylic coating on both sides.
 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

3. Color: As selected by Architect from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F (111 deg C); and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Atlas Roofing Corporation; Summit.
 - b. Engineered Coated Products; Nova-Seal II.
 - c. Kirsch Building Products, LLC; Sharkskin Ultra.
 - d. SDP Advanced Polymer Products Inc; Palisade.
- C. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
 - e. Metal-Fab Manufacturing, LLC; MetShield.
 - f. Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
 - g. Polyguard Products, Inc.; Deck Guard HT.
 - h. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
 - i. SDP Advanced Polymer Products Inc; Palisade SA-HT.
 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
 3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.
- D. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 4. Fasteners for Zinc-Coated (Galvanized) Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
 - 1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.

2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.~Rivet joints where necessary for strength.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Downspouts: Fabricate round downspouts to dimensions indicated, complete with mitered elbows. Furnish with fabricated aluminum hangers (Ref. detail dwg.).

2.7 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm)
- B. Valley Flashing: Fabricate from the following materials:
1. Aluminum 0.032 inch (0.81 mm)
- C. Drip Edges: Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm)
- D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm) thick.

2.8 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm) thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 5. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of [uncoated-aluminum] [and] [stainless-steel] sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder aluminum sheet.
- H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal/extruded roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Downspouts: To be extruded in single lengths – no joints except at concealed change of direction. Provide hangers as per detail and designed to hold downspouts securely to walls.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- C. Pipe or Post Counter flashing: Install counter flashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- D. Counter flashing: Coordinate installation of counter flashing with installation of base flashing. Insert counter flashing in reglets or receivers and fit tightly to base flashing. Extend counter flashing 4 inches (100 mm) over base flashing. Lap counter flashing joints minimum of 4 inches (100 mm).

- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof-edge flashings.
 - 2. Roof-edge drainage systems.
 - 3. Reglets and counterflashings.
- B. Related Sections: Retain Sections in subparagraphs below that contain requirements Contractor might expect to find in this Section but are specified in other Sections.
 - 1. [Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section 076200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
 - 3. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. SPRI Wind Design Standard: Manufacture and install roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: As indicated on Drawings.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof specialties. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work. Include the following:
 - 1. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 - 2. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - 3. Details of termination points and assemblies, including fixed points.
 - 4. Details of special conditions.
- C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- D. Samples for Verification: For roof-edge flashings roof-edge drainage systems reglets and counterflashings made from 12-inch (300-mm) lengths of full-size components including fasteners, cover joints, accessories, and attachments.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for roof-edge flashings.
- B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof edge, including fascia gutter and downspout, approximately 10 feet (3.0 m) long, including supporting construction, seams, attachments, underlayment, and accessories.
 - 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. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.
2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED METALS

- A. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
 1. Non-Patinated Exposed Finish: Mill.
 2. Pre-Patinated Copper-Sheet Finish: Pre-patinated according to ASTM B 882.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 1. Surface: Smooth, flat finish.
 2. Mill Finish: As manufactured.
 3. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

- b. Three-Coat Fluoropolymer: AAMA 620. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.
 - c. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
 - 4. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 - 5. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
- C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
 - 1. Exposed High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2604. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - b. Three-Coat Fluoropolymer: AAMA 2605. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.
 - 2. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 - 3. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
- D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
 - 1. Surface: Smooth, flat finish.
 - 2. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
 - 3. Exposed Coil-Coated Finishes: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - b. Three-Coat Fluoropolymer: AAMA 621. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.

2.2 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
 - 3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
 - f. Or approved equal.
- C. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.
- D. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kb/sq. m) minimum, rosin sized.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
 - 3. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
 - 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

- D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- G. Solder for Copper: ASTM B 32, lead-free solder. Grade Sn50..

2.5 ROOF-EDGE DRAINAGE SYSTEMS

- 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 or approved equal:
 - 1. Andreas Renner KG.
 - 2. Architectural Products Company.
 - 3. ATAS International, Inc.
 - 4. Berger Building Products, Inc.
 - 5. Castle Metal Products.
 - 6. Cheney Flashing Company.
 - 7. CopperCraft by FABRAL; a Euramax company.
 - 8. Hickman Company, W. P.
 - 9. Klauer Manufacturing Company.
 - 10. Merchant & Evans, Inc.
 - 11. Metal-Era, Inc.
 - 12. Metal-Fab Manufacturing, LLC.
 - 13. MM Systems Corporation.
 - 14. National Sheet Metal Systems, Inc.
 - 15. Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.
- B. Gutters: Manufactured in uniform section lengths not exceeding 12 feet (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
 - 1. Fabricate from the following exposed metal:
 - a. Formed Aluminum: 0.063 inch (1.60 mm) thick.
 - 2. Gutter Profile: As indicated according to SMACNA's "Architectural Sheet Metal Manual."
 - 3. Corners: Factory mitered and continuously welded and sealed watertight].
 - 4. Gutter Supports: Gutter brackets as shown on drawings.
 - 5. Gutter Accessories: Continuous screened leaf guard with sheet metal frame. Wire ball downspout strainer.
- C. Downspouts: Thin wall extruded aluminum tubing complete with smooth-curve elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Extruded Aluminum: 0.125 inch (3.18 mm) thick.
- D. Aluminum Finish: Two-coat fluoropolymer.

1. Color: As selected by Architect from manufacturer's full range.

2.6 REGLETS AND COUNTERFLASHINGS

- 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 or approved equal:
1. Castle Metal Products.
 2. Cheney Flashing Company.
 3. Fry Reglet Corporation.
 4. Heckmann Building Products Inc.
 5. Hickman Company, W. P.
 6. Keystone Flashing Company, Inc.
 7. Metal-Era, Inc.
 8. Metal-Fab Manufacturing, LLC.
 9. MM Systems Corporation.
 10. National Sheet Metal Systems, Inc.
- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
1. Formed Aluminum: 0.050 inch (1.27 mm) thick.
 2. Stainless Steel: 0.025 inch (0.64 mm) thick.
 3. Zinc-Coated Steel: Nominal 0.028-inch (0.71-mm) thickness.
 4. Corners: Factory mitered and continuously welded.
 5. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 6. Stucco Type, Embedded: Provide reglets with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 7. Concrete Type, Embedded: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 8. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
 9. Multiuse Type, Embedded: For multiuse embedment in [cast-in-place concrete] [masonry mortar joints].
- C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches (100 mm) and in lengths not exceeding 12 feet (3.6 m) designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
1. Formed Aluminum: 0.032 inch (0.81 mm) thick.
 2. Stainless Steel: 0.025 inch (0.64 mm) thick.
 3. Zinc-Coated Steel: Nominal 0.028-inch (0.71-mm) thickness.
- D. Accessories:
1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
 2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

- E. Aluminum Finish: Two-coat fluoropolymer finish.
 - 1. Color: As selected by Architect from manufacturer's full range.
- F. Stainless-Steel Finish: No. 2B bright, cold rolled, unpolished.
- G. Zinc-Coated Steel Finish: Two-coat fluoropolymer.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).
- B. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
- C. Polyethylene Sheet: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches (50 mm).

- D. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.3 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of [uncoated aluminum] [and] [stainless-steel] roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of [felt underlayment and cover with a slip sheet] [self-adhering, high-temperature sheet underlayment] [or] [polyethylene sheet].
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 - 1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise shown on Drawings.
 - 2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints with elastomeric butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets

using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.4 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches (610 mm) apart. Attach ends with rivets and solder to make watertight. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.2 m) apart. Install expansion joint caps.
 - 2. Install continuous leaf guards on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Downspouts: Join sections with interior sleeves. Provide hangers with fasteners designed to hold downspouts securely to walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
 - 1. Provide elbows at base of downspout to direct water away from building.
 - 2. Connect downspouts to underground drainage system indicated.

3.5 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Embedded Reglets: See Section 033000 "Cast-in-Place Concrete" and Section 042000 "Unit Masonry" for installation of reglets.
- C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches (100 mm) over top edge of base flashings.
- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches (100 mm) over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with [elastomeric] [butyl] sealant. Fit counterflashings tightly to base flashings.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners,

metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

- C. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Equipment supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated.
- B. Shop Drawings: For roof accessories.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items.
- B. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
 - 1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
 - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 - 3. Exposed Coil-Coated Finish: Two-coat fluoropolymer finish; AAMA 621; system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

4. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat.
- B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.
1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 2. Exposed Coil-Coated Finish: Two-coat fluoropolymer finish; AAMA 621; system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight
 3. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat.
- C. Aluminum Sheet: ASTM B 209 (ASTM B 209M), manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
1. Mill Finish: As manufactured.
 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 3. Clear Anodic Finish: AAMA 611, Class II, 0.010 mm or thicker.
 4. Color Anodic Finish: AAMA 611, Class II, 0.010 mm or thicker.
 5. Exposed Coil-Coated Finish: Two-coat fluoropolymer finish; AAMA 620; system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 6. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm).
- D. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), manufacturer's standard alloy and temper for type of use, finished to match assembly where used, otherwise mill finished.
- E. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.
- F. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Acrylic Glazing: ASTM D 4802, thermoformable, monolithic sheet, manufacturer's standard, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).
- C. Polycarbonate Glazing: Thermoformable, monolithic polycarbonate sheets manufactured by extrusion process, burglar-resistance rated according to UL 972 with an average impact strength of 12 to 16 ft-lbf/in. (640 to 854 J/m) of width when tested according to ASTM D 256, Method A (Izod).

- D. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
- E. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- F. Sealants: As recommended by roof accessory manufacturer for installation indicated.

2.3 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AES Industries, Inc.
 - b. Curbs Plus, Inc.
 - c. Custom Solution Roof and Metal Products.
 - d. Greenheck Fan Corporation.
 - e. LM Curbs.
 - f. Metallic Products Corp.
 - g. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - h. Pate Company (The).
 - i. Roof Products, Inc.
 - j. Safe Air of Illinois.
 - k. Thybar Corporation.
 - l. Vent Products Co., Inc.
- B. Material: Aluminum-zinc alloy-coated steel sheet, 0.079 inch (2.01 mm) thick.
 - 1. Finish: Two-coat fluoropolymer.
 - 2. Color: As selected by Architect from manufacturer's full range.
- C. Material: Aluminum sheet, 0.090 inch (2.28 mm) thick.
 - 1. Finish: Two-coat fluoropolymer.
 - 2. Color: As selected by Architect from manufacturer's full range.
- D. Material: Stainless-steel sheet, 0.078 inch (1.98 mm) thick.
 - 1. Finish: Manufacturer's standard.
- E. Construction:
 - 1. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
 - 2. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 - 3. Factory-installed wood nailer at top of curb, continuous around curb perimeter.

4. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
5. Fabricate curbs to minimum height of 12 inches (300 mm) unless otherwise indicated.
6. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.
7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.
8. Security Grille: Provide where indicated.

2.4 EQUIPMENT SUPPORTS

- A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, and integrally formed deck-mounting flange at perimeter bottom.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AES Industries, Inc.
 - b. Curbs Plus, Inc.
 - c. Custom Solution Roof and Metal Products.
 - d. Greenheck Fan Corporation.
 - e. LM Curbs.
 - f. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - g. Pate Company (The).
 - h. Roof Products, Inc.
 - i. Thybar Corporation.
 - j. Vent Products Co., Inc.
- B. Material: Aluminum-zinc alloy-coated steel sheet, 0.079 inch (2.01 mm) thick.
1. Finish: Two-coat fluoropolymer.
 2. Color: As selected by Architect from manufacturer's full range
- C. Material: Aluminum sheet, 0.090 inch (2.28 mm) thick.
1. Finish: Two-coat fluoropolymer.
 2. Color: As selected by Architect from manufacturer's full range.
- D. Material: Stainless-steel sheet, 0.078 inch (1.98 mm) thick.
1. Finish: Manufacturer's standard.
- E. Construction:
1. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
 2. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
 3. Factory-installed continuous wood nailers 3-1/2 inches (90 mm) wide at tops of equipment supports.

4. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
5. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
6. Fabricate equipment supports to minimum height of 12 inches (300 mm) unless otherwise indicated.
7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.
8. Security Grille: Provide where indicated.

2.5 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated [single] [double]-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.
1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AES Industries, Inc.
 - b. Babcock-Davis.
 - c. Bilco Company (The).
 - d. Bristolite Skylights.
 - e. Custom Solution Roof and Metal Products.
 - f. Dur-Red Products.
 - g. Hi Pro International, Inc.
 - h. J. L. Industries, Inc.
 - i. Metallic Products Corp.
 - j. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - k. Naturalite Skylight Systems; Vistawall Group (The).
 - l. Nystrom.
 - m. O'Keeffe's Inc.
 - n. Pate Company (The).
 - o. Precision Ladders, LLC.
- B. Type and Size: Single-leaf lid, 30 by 36 inches (750 by 900 mm).
- C. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 20-lbf/sq. ft. (0.95-kPa) internal uplift load.
- D. Hatch Material: Aluminum sheet, 0.090 inch (2.28 mm) thick.
1. Finish: Two-coat fluoropolymer.
 2. Color: As selected by Architect from manufacturer's full range.
- E. Construction:
1. Insulation: Glass-fiber board.
 2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
 3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.

4. Fabricate curbs to minimum height of 12 inches (300 mm) unless otherwise indicated.
- F. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
 1. Provide two-point latch on lids larger than 84 inches (2130 mm).
 2. Provide remote-control operation.
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
- H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. Post locks in place on full extension; release mechanism returns post to closed position.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.
 1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
- C. Seal joints with sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

- C. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 07841 - FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes
 1. Through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
 2. Sealing of new and existing voids and penetrations in rated assemblies and corridor partitions
 3. Perimeter and joint systems
 4. This section shall govern all firestopping work by the general contractor, other prime contractors, subcontractors and all trades.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following smoke and fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 1. Fire-resistance-rated walls and partitions, including fire walls, fire separations, and smoke barriers.
 - a. Corridor Walls unless noted otherwise.
 - b. Stair and MEP Shafts shall be 2 hours unless noted otherwise.
 2. Fire-resistance-rated horizontal assemblies including floors: 2 hours unless noted otherwise.
 3. Corridor Smoke partitions.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures
 3. L-Rated Systems: Where through-penetrations occur in smoke barriers, provide through-penetration firestop systems with L-ratings of not more than 3.0 cfm/sq. ft at both ambient temperatures and 400 deg F.

- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Through-Penetration Firestop System Schedule: Submittal(s) shall include summary tabulation of each through-penetration firestop system and application, along with the following information:
 - 1. Name of installing contractor, system and/or trade (i.e. Plumbing).
 - 2. Application and Types of penetrating items, (i.e. insulated metal pipe smaller than 2½").
 - 3. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 - 4. Fire stopping manufacturer's model / system number.
 - 5. Through-penetration firestop systems for each location identified by firestop design designation (U.L. Number) of qualified testing and inspecting agency.
 - 6. Color(s) of exposed sealant for each application.
- D. Qualification Data: For Installer.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm and workmen experienced in installing through-penetration firestop systems 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 manufacturers' and listing agencies' requirements. Manufacturer's willingness to sell its

through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer. Note, different components of the work and/or trades may use products by different manufacturers.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, OPL ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application on Drawings that are produced by one of the following manufacturers:
 - 1. A/D Fire Protection Systems Inc.
 - 2. Grace, W. R. & Co. - Conn.
 - 3. Hilti, Inc.
 - 4. Johns Manville.
 - 5. Nelson Firestop Products.
 - 6. RectorSeal Corporation (The).
 - 7. Specified Technologies Inc.
 - 8. 3M; Fire Protection Products Division.
 - 9. Tremco; Sealant/Weatherproofing Division.
 - 10. USG Corporation.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system 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 through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

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

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial

Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07841

SECTION 079500 - EXPANSION CONTROL

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.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Architectural joint systems for building interiors.
 - 2. Architectural joint systems for building exteriors.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for cast-in architectural-joint- system frames furnished, but not installed, in this Section.
 - 2. Division 04 Section "Unit Masonry" for masonry wall joint systems.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal wall joint systems.
 - 4. Division 07 Section "Fire-Resistive Joint Systems" for liquid-applied joint sealants in fire-resistive building joints.
 - 5. Division 07 Section "Joint Sealants" for liquid-applied joint sealants.

1.3 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint.
- D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.4 SUBMITTALS

- A. Shop Drawings: Provide the following for each joint system specified and obtain approval prior to fabrication and shipment of materials to the job site:
 - 1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- B. Product Data: Submit copies of manufacturer's latest published literature for materials

specified herein for approval, and obtain approval before materials are fabricated and delivered to the site. Data to clearly indicate movement capability of cover assemblies and suitability of material used in exterior seal for UV exposure.

- C. Samples for Initial Selection: For each type of joint system indicated.
 - 1. Include manufacturer's color charts showing the standard range of colors and finishes available for each exposed metal and elastomeric seal material.
- D. Certificates – Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-rated expansion joint assemblies with requirements indicated.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by manufacturer.
- B. Source Limitations: Obtain all architectural joint systems through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Loading Characteristics: Standard loading refers to covers that are capable of withstanding up to 500 lb. point loads. Heavy duty refers to covers that are capable of withstanding up to 2000 lb. point loads.
- E. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 and/or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction. Fire rating not less than the rating of adjacent construction.
- F. Manufacturer to provide 5 year warranty for all joint covers.

1.6 COORDINATION

- A. Coordinate installation of exterior wall joint systems with roof expansion assemblies to ensure that wall transitions are watertight.

PART 2 –PRODUCTS

2.01 MATERIALS

- A. Aluminum: ASTM B 221, Alloy 6005A-T61, 6063-T5, 6061-T5, 6105-T5 for extrusions; ASTM B 209, Alloy 6061-T6, 3003-H14, 5005-H34 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
 2. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
- B Stainless Steel: ASTM A 666, Type 304 for plates, sheet, and strips.
1. Finish: No.4, directional satin.
 - a. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- C. Brass: ASTM B 36/B 36M, UNS Alloy C26000 for half hard sheet and coil.
- D. Bronze: ASTM B 455, Alloy C38500 for extrusions; Alloy C28000 Muntz Metal for plates.
- E. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.
- F. Compression Seals: ASTM D2000; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.
- G. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.
- H. Moisture Barrier: 7-ply laminate reinforced Polyethylene.
- I. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

- A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
- B. Design architectural joint systems for the following size and movement characteristics:
1. Nominal Joint Width: *As indicated on Drawings*

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

- A. Basis of Design: Construction Specialties, Inc., 6696 Route 405 Highway, Muncy, PA, shall manufacture expansion joint cover assemblies specified herein and indicated on the drawings. Subject to compliance with requirements, provide a product indicated or a comparable product by one of the following:
1. Balco, Inc

2. MM System Corporation

B. Floor-to-Floor Joint Systems:

1. Basis-of-Design Product: Construction Specialties, Inc. model *GFPS*
2. Type: Surface mounted.
3. Type: Elastomeric seal.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Seal Material: CS Thermoplastic Rubber (TPR).
 - 1) Color: As selected by Architect from manufacturer's standard range. 2)

Gaskets to be dual durometer and have a flat profile that is free of ridges/reveals that collect dirt.
4. Attachment Method: Mechanical anchors.
5. Load Capacity: Standard duty.
6. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
7. Moisture Barrier: Manufacturer's standard.

C Floor-to-Wall Joint Systems:

1. Basis-of-Design Product: Construction Specialties, Inc. model *GFS*, and *GFSW*,
2. Type: Surface mounted.
3. Type: Elastomeric seal.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Seal Material: CS Thermoplastic Rubber (TPR).
 - 1) Color: As selected by Architect from manufacturer's standard range. 2)

Gaskets to be dual durometer and have a flat profile that is free of ridges/reveals that collect dirt.
4. Attachment Method: Mechanical anchors. 5.
Load Capacity: Standard duty.
6. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction. (*delete if not required*)
7. Moisture Barrier: Manufacturer's standard. (*delete if not required*)

2.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

- A. Basis of Design: Construction Specialties, Inc., 6696 Route 405 Highway, Muncy, PA, shall manufacture expansion joint cover assemblies specified herein and indicated on the drawings. Subject to compliance with requirements, provide a product indicated or a comparable product by one of the following:

1. Balco, Inc
 2. MM System Corporation
- B. Basis of Design Product: Construction Specialties – ASM-X
1. Type: Snap-on cover.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Secondary Seal: 7-ply laminate reinforced Polyethylene.
 2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 -EXECUTION

3.01 EXAMINATION

- A. Examine surfaces and blockouts where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.
- C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.
- D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.
 1. Install in true alignment and proper relationship to joints and adjoining finished

- surfaces measured from established lines and levels.
 - 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper joint installation and performance.
 - 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 4. Locate in continuous contact with adjacent surfaces.
 - 5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.
 - 6. Heavy-Duty Systems: Repair or grout blockout as required for continuous frame support and to bring frame to proper level. Shimming is not allowed.
 - 7. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
- 1. Provide in continuous lengths for straight sections.
 - 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Compression Seals: Apply adhesive or lubricant adhesive as recommended by manufacturer before installing compression seals.
- E. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- F. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- G. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings. Provide drainage fittings where indicated.

3.4 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

SECTION 079500 - EXPANSION CONTROL

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.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Architectural joint systems for building interiors.
 - 2. Architectural joint systems for building exteriors.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for cast-in architectural-joint- system frames furnished, but not installed, in this Section.
 - 2. Division 04 Section "Unit Masonry" for masonry wall joint systems.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal wall joint systems.
 - 4. Division 07 Section "Fire-Resistive Joint Systems" for liquid-applied joint sealants in fire-resistive building joints.
 - 5. Division 07 Section "Joint Sealants" for liquid-applied joint sealants.

1.3 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint.
- D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.4 SUBMITTALS

- A. Shop Drawings: Provide the following for each joint system specified and obtain approval prior to fabrication and shipment of materials to the job site:
 - 1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- B. Product Data: Submit copies of manufacturer's latest published literature for materials

specified herein for approval, and obtain approval before materials are fabricated and delivered to the site. Data to clearly indicate movement capability of cover assemblies and suitability of material used in exterior seal for UV exposure.

- C. Samples for Initial Selection: For each type of joint system indicated.
 - 1. Include manufacturer's color charts showing the standard range of colors and finishes available for each exposed metal and elastomeric seal material.
- D. Certificates – Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-rated expansion joint assemblies with requirements indicated.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by manufacturer.
- B. Source Limitations: Obtain all architectural joint systems through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Loading Characteristics: Standard loading refers to covers that are capable of withstanding up to 500 lb. point loads. Heavy duty refers to covers that are capable of withstanding up to 2000 lb. point loads.
- E. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 and/or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction. Fire rating not less than the rating of adjacent construction.
- F. Manufacturer to provide 5 year warranty for all joint covers.

1.6 COORDINATION

- A. Coordinate installation of exterior wall joint systems with roof expansion assemblies to ensure that wall transitions are watertight.

PART 2 –PRODUCTS

2.01 MATERIALS

- A. Aluminum: ASTM B 221, Alloy 6005A-T61, 6063-T5, 6061-T5, 6105-T5 for extrusions; ASTM B 209, Alloy 6061-T6, 3003-H14, 5005-H34 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
 2. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
- B Stainless Steel: ASTM A 666, Type 304 for plates, sheet, and strips.
1. Finish: No.4, directional satin.
 - a. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- C. Brass: ASTM B 36/B 36M, UNS Alloy C26000 for half hard sheet and coil.
- D. Bronze: ASTM B 455, Alloy C38500 for extrusions; Alloy C28000 Muntz Metal for plates.
- E. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.
- F. Compression Seals: ASTM D2000; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.
- G. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.
- H. Moisture Barrier: 7-ply laminate reinforced Polyethylene.
- I. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

- A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
- B. Design architectural joint systems for the following size and movement characteristics:
1. Nominal Joint Width: *As indicated on Drawings*

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

- A. Basis of Design: Construction Specialties, Inc., 6696 Route 405 Highway, Muncy, PA, shall manufacture expansion joint cover assemblies specified herein and indicated on the drawings. Subject to compliance with requirements, provide a product indicated or a comparable product by one of the following:
1. Balco, Inc

2. MM System Corporation

B. Floor-to-Floor Joint Systems:

1. Basis-of-Design Product: Construction Specialties, Inc. model *GFPS*
2. Type: Surface mounted.
3. Type: Elastomeric seal.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Seal Material: CS Thermoplastic Rubber (TPR).
 - 1) Color: As selected by Architect from manufacturer's standard range. 2)

Gaskets to be dual durometer and have a flat profile that is free of ridges/reveals that collect dirt.
4. Attachment Method: Mechanical anchors.
5. Load Capacity: Standard duty.
6. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
7. Moisture Barrier: Manufacturer's standard.

C Floor-to-Wall Joint Systems:

1. Basis-of-Design Product: Construction Specialties, Inc. model *GFS*, and *GFSW*,
2. Type: Surface mounted.
3. Type: Elastomeric seal.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Seal Material: CS Thermoplastic Rubber (TPR).
 - 1) Color: As selected by Architect from manufacturer's standard range. 2)

Gaskets to be dual durometer and have a flat profile that is free of ridges/reveals that collect dirt.
4. Attachment Method: Mechanical anchors. 5.
Load Capacity: Standard duty.
6. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction. (*delete if not required*)
7. Moisture Barrier: Manufacturer's standard. (*delete if not required*)

2.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

- A. Basis of Design: Construction Specialties, Inc., 6696 Route 405 Highway, Muncy, PA, shall manufacture expansion joint cover assemblies specified herein and indicated on the drawings. Subject to compliance with requirements, provide a product indicated or a comparable product by one of the following:

1. Balco, Inc
 2. MM System Corporation
- B. Basis of Design Product: Construction Specialties – ASM-X
1. Type: Snap-on cover.
 - a. Exposed Metal: Aluminum.
 - 1) Finish: Class II, clear anodic.
 - b. Secondary Seal: 7-ply laminate reinforced Polyethylene.
 2. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 -EXECUTION

3.01 EXAMINATION

- A. Examine surfaces and blockouts where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.
- C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.
- D. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.
 1. Install in true alignment and proper relationship to joints and adjoining finished

- surfaces measured from established lines and levels.
 - 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper joint installation and performance.
 - 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 4. Locate in continuous contact with adjacent surfaces.
 - 5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.
 - 6. Heavy-Duty Systems: Repair or grout blockout as required for continuous frame support and to bring frame to proper level. Shimming is not allowed.
 - 7. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
- 1. Provide in continuous lengths for straight sections.
 - 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Compression Seals: Apply adhesive or lubricant adhesive as recommended by manufacturer before installing compression seals.
- E. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- F. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- G. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings. Provide drainage fittings where indicated.

3.4 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

SECTION 081213 - HOLLOW METAL 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 frames.
- B. Related Requirements:
 - 1. Section 081416 "Flush Wood Doors" for wood doors installed in hollow-metal 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, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 2. Locations of reinforcement and preparations for hardware.
 - 3. Details of each different wall opening condition.
 - 4. Details of anchorages, joints, field splices, and connections.
 - 5. Details of moldings, removable stops, and glazing.
 - 6. 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: Prepare Samples to demonstrate compliance with requirements for quality of materials and construction. 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 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 unit to permit air circulation.

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. Amweld International, LLC.
 - 2. Apex Industries, Inc.
 - 3. Ceco Door Products; an Assa Abloy Group company.
 - 4. Commercial Door & Hardware Inc.
 - 5. Concept Frames, Inc.
 - 6. Curries Company; an Assa Abloy Group company.
 - 7. Custom Metal Products.
 - 8. Daybar.
 - 9. Deansteel.
 - 10. de La Fontaine Industries.
 - 11. DKS Steel Door & Frame Sys. Inc.
 - 12. Door Components, Inc.
 - 13. Fleming-Baron Door Products.
 - 14. Gensteel Doors Inc.

15. Greensteel Industries, Ltd.
16. HMF Express.
17. Hollow Metal Inc.
18. Hollow Metal Xpress.
19. J/R Metal Frames Manufacturing, Inc.
20. Karpen Steel Custom Doors & Frames.
21. L.I.F. Industries, Inc.
22. LaForce, Inc.
23. Megamet Industries, Inc.
24. Mesker Door Inc.
25. Michbi Doors Inc.
26. MPI Group, LLC (The).
27. National Custom Hollow Metal.
28. North American Door Corp.
29. Philipp Manufacturing Co (The).
30. Pioneer Industries, Inc.
31. Premier Products, Inc.
32. Republic Doors and Frames.
33. Rocky Mountain Metals, Inc.
34. Security Metal Products Corp.
35. Shanahans Manufacturing Ltd.
36. Steelcraft; an Ingersoll-Rand company.
37. Steward Steel; Door Division.
38. Stiles Custom Metal, Inc.
39. Titan Metal Products, Inc.
40. Trillium Steel Doors Limited.
41. West Central Mfg. Inc.

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

2.2 REGULATORY REQUIREMENTS

2.3 INTERIOR FRAMES

- A. Construct interior frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Hollow-Metal Frames: NAAMM-HMMA 860. At locations indicated in the Door and Frame Schedule.
1. Physical Performance: Level A according to SDI A250.4.
 2. Materials: Metallic-coated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
 3. Construction: Slip-on drywall and Full profile welded.
 4. Exposed Finish: Prime.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 - 1. 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.

2.5 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
- F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.6 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 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. 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. 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.
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.
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.
- C. 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 frames to receive nontemplated, mortised, and surface-mounted hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.8 ACCESSORIES

- A. 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 frames to receive nontemplated, mortised, and surface-mounted 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 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. 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.
 - 5. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 - 6. 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.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: 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.

END OF SECTION 081213

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Sections:
 - 1. Division 8 Section "Door Hardware"

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Undercuts.
 - 5. Doors to be factory finished and finish requirements.
 - 6. Fire protection ratings for fire-rated doors.
- C. Samples: Corner sections of doors, approximately 8 by 10 inches, with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flush Wood Doors:
 - a. Algoma Hardwoods Inc.
 - b. Eggers Industries; Architectural Door Division.
 - c. Mohawk Flush Doors, Inc.
 - d. Oshkosh Architectural Door Co.
 - e. Weyerhaeuser Company.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

- B. WDMA I.S.1-A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
- C. Particleboard-Core Doors:
 - 1. Particleboard: ANSI A208.1, **Grade LD-1, made with binder containing no urea-formaldehyde.**
 - 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - 3. Provide doors with **structural-composite-lumber** cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Cores: Provide mineral core as needed to provide fire-protection rating indicated.
 - 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 - 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- F. Mineral-Core Doors:
 - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
 - 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
 - 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
 - 1. Grade: Premium, with Grade AA
 - 2. Species: Select White Ash.
 - 3. Cut: Plain Sliced.
 - 4. Assembly of Veneer Leaves on Door Faces: Balance match.
 - 5. Pair and Set Match: Provide for doors hung in same opening.
 - 6. Core: Structural Composite Lumber.
 - 7. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: AWI conversion varnish system.
 - 3. Staining: TBD.
 - 4. Sheen: Matt.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Division 8 Section 08710 - Door Hardware.
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
 - 2. Install smoke- and draft-control doors according to NFPA 105.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.

- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

- B. Section Includes:
 - 1. Exterior and interior storefront framing.
- C. Related Sections:
 - 1. Section 084229.33 "Swinging Automatic Entrances" for swinging automatic entrances.

DEFINITIONS

- D. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

PERFORMANCE REQUIREMENTS

- E. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
 - 1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 - 2. Dimensional tolerances of building frame and other adjacent construction.
 - 3. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferring to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - d. Glazing-to-glazing contact.
 - e. Noise or vibration created by wind and by thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant failure.
 - h. Failure of operating units.
- F. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- G. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.

- a. Basic Wind Speed: 127 mph
 - b. Importance Factor: 1.0.
 - c. Exposure Category: B.
2. Seismic Loads: As indicated on Drawings.
- H. Deflection of Framing Members:
 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
 2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or 1/8 inch (3.2 mm), whichever is smaller.
- I. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
 2. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- J. Windborne-Debris-Impact-Resistance Performance: Provide aluminum-framed systems that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996.
 1. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
 2. Small-Missile Impact: For aluminum-framed systems located more than 30 feet (9.1 m) above grade.
- K. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- L. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft. (300 Pa)] <Insert pressure>.
- M. Water Penetration under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
 1. Maximum Water Leakage: According to AAMA 501.1.
- N. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
 - b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
3. Interior Ambient-Air Temperature: 75 deg F (24 deg C).
- O. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.
- P. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K) when tested according to AAMA 1503.
- Q. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having the following sound-transmission characteristics:
 1. Sound Transmission Class (STC): Minimum 30 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.
 2. Outdoor-Indoor Transmission Class (OITC): Minimum 30 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- R. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
- S. Structural-Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

ACTION SUBMITTALS

- T. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- U. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
 2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- V. Samples for Initial Selection: For units with factory-applied color finishes.

- W. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- X. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- Y. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- Z. Delegated-Design Submittal: For aluminum-framed systems 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. Detail fabrication and assembly of aluminum-framed systems.
 - 2. Include design calculations.

INFORMATIONAL SUBMITTALS

- AA. Qualification Data: For qualified Installer and testing agency.
- BB. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- CC. Welding certificates.
- DD. Preconstruction Test Reports: For sealant.
- EE. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- FF. Source quality-control reports.
- GG. Quality-Control Program for Structural-Sealant-Glazed System: Include reports.
- HH. Field quality-control reports.
- II. Warranties: Sample of special warranties.

CLOSEOUT SUBMITTALS

JJ. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

QUALITY ASSURANCE

KK. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

LL. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

MM. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

NN. Quality-Control Program for Structural-Sealant-Glazed System: Develop quality control program specifically for Project. Document quality-control procedures and verify results for aluminum-framed systems. Comply with ASTM C 1401 recommendations including, but not limited to, system material-qualification procedures, preconstruction sealant-testing program, procedures for system fabrication and installation, and intervals of reviews and checks.

OO. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

PP. Preconstruction Sealant Testing: For structural-sealant-glazed systems, perform sealant manufacturer's standard tests for compatibility with and adhesion of each material that will come in contact with sealants and each condition required by aluminum-framed systems.

1. Test a minimum five samples each of metal, glazing, and other material.
2. Prepare samples using techniques and primers required for installed systems.
3. For materials that fail tests, determine corrective measures necessary to prepare each material to ensure compatibility with and adhesion of sealants including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.

QQ. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

RR. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

SS. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

TT. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

UU. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

VV. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.
2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
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. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

WW. Preinstallation Conference: Conduct conference at Project site.

PROJECT CONDITIONS

XX. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

WARRANTY

YY. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals[, metal finishes,] and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components.
2. Warranty Period: Five years from date of Substantial Completion.

ZZ. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: Five years from date of Substantial Completion.

MAINTENANCE SERVICE

AAA. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components,

lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

BBB. Structural-Sealant-Glazed Systems:

1. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of structural-sealant-glazed system Installer. Include quarterly preventive maintenance, repair or replacement to ensure long-term performance and durability of structural-sealant-glazed system as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original system.
2. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

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. Arcadia, Inc.
 2. Arch Aluminum & Glass Co., Inc.
 3. CMI ArchitecturalCommercial Architectural Products, Inc.
 4. EFCO Corporation.
 5. Kawneer North America; an Alcoa company.
 6. Leed Himmel Industries, Inc.
 7. Pittco Architectural Metals, Inc.
 8. TRACO.
 9. Tubelite.
 10. United States Aluminum.
 11. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
 12. YKK AP America Inc.
 13. Or approved equal.

MATERIALS

- B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- C. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

FRAMING SYSTEMS

- D. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: As indicated.
- E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- F. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from stainless steel.
- G. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- H. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- I. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PRODUCT DATA SHEET 1 - GLAZING SYSTEMS

- A. Glazing: As specified in Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically

formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.

- a. Sealants used inside the weatherproofing system shall have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - c. Color: Black.
2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Sealants used inside the weatherproofing system shall have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Color: Matching structural sealant.

ENTRANCE DOOR SYSTEMS

- F. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 2. Door Design: As indicated on drawings.
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
 3. Glazing Stops and Gaskets: Square snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- G. Entrance Door Hardware: As specified in Section 087100 "Door Hardware."

ENTRANCE DOOR HARDWARE

- H. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule.
 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and 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.
 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- I. Opening-Force Requirements:
1. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force of not more than 15 lbf (67 N) for not more than 3 seconds.
 2. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.
- J. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
 2. Exterior Hinges: Stainless steel, with stainless-steel pin.
 3. Quantities:
 - a. For doors up to 87 inches (2210 mm) high, provide 3 hinges per leaf.
 - b. For doors more than 87 and up to 120 inches (2210 and up to 3048 mm) high, provide 4 hinges per leaf.
- K. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.
- L. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- M. Manual Flush Bolts: BHMA A156.16, Grade 1.
- N. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.
- O. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- P. Cylinders: As specified in Section 087100 "Door Hardware."
- Q. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- R. Operating Trim: BHMA A156.6.
- S. Removable Mullions: BHMA A156.3, extruded aluminum.
1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

- T. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- U. Concealed Overhead Holders: BHMA A156.8, Grade 1.
- V. Surface-Mounted Holders: BHMA A156.16, Grade 1.
- W. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- X. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC. Lining Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- Y. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- Z. Silencers: BHMA A156.16, Grade 1.
- AA. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (13 mm).
- BB. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

ACCESSORY MATERIALS

- CC. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 079200 "Joint Sealants."
 - 1. Sealants used inside the weatherproofing system shall have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- DD. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

FABRICATION

- EE. Form or extrude aluminum shapes before finishing.
- FF. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- GG. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.

4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing from [exterior] [interior] [interior for vision glass and exterior for spandrel glazing or metal panels].
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- HH. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- II. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- JJ. Storefront Framing: Fabricate components for assembly using [shear-block system] [screw-spline system] [head-and-sill-receptor system with shear blocks at intermediate horizontal members] <Insert system>.
- KK. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At exterior doors, provide compression weather stripping at fixed stops.
 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- LL. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- MM. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- NN. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

ALUMINUM FINISHES

- OO. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm AA-M12C22A31, Class II, 0.010 mm or thicker.
- PP. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
1. Color: As selected by Architect from full range of industry colors and color densities.
- QQ. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1. Color and Gloss: As selected by Architect from manufacturer's full range.
- RR. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and

apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

SS. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

SOURCE QUALITY CONTROL

TT. Testing Agency: Engage a qualified testing agency to evaluate structural-sealant-glazed systems.

UU. Structural-Sealant-Glazed Systems: Perform quality-control procedures complying with ASTM C 1401 recommendations, including, but not limited to, system material-qualification procedures, sealant testing, and system fabrication reviews and checks.

VV. Structural-sealant-glazed system will be considered defective if it does not pass tests and inspections.

WW. Prepare test and inspection reports.

PART 3 - EXECUTION

EXAMINATION

- A. Examine areas 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.

INSTALLATION

- C. General:
 1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 6. Seal joints watertight unless otherwise indicated.
- D. Metal Protection:
 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- E. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- F. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- G. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- H. Install glazing as specified in Section 088000 "Glazing."
 - 1. Structural-Sealant Glazing:
 - a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
 - b. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- I. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- J. Install perimeter joint sealants as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

ERECTION TOLERANCES

- K. Install aluminum-framed systems to comply with the following maximum erection tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 - 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
- L. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

FIELD QUALITY CONTROL

- M. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- N. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Structural-Sealant Compatibility and Adhesion: Structural sealant shall be tested according to recommendations in ASTM C 1401.
 - a. Destructive Test Method A, "Hand Pull Tab (Destructive)," in ASTM C 1401, Appendix X2, shall be used.
 - 1) A minimum of two areas on each building face shall be tested.
 - 2) Repair installation areas damaged by testing.
 2. Structural-Sealant Glazing Inspection: After installation of aluminum-framed systems is complete, structural-sealant glazing shall be inspected and evaluated according to recommendations in ASTM C 1401.
 3. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft. (0.03 L/s per sq. m), of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa) 6.24 lbf/sq. ft. (300 Pa).
 4. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft. (200 Pa), and shall not evidence water penetration.
 5. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet (23 m) by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- O. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- P. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- Q. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- R. Prepare test and inspection reports.

END OF SECTION 084113

SECTION 084229.33 - SWINGING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior and interior, swinging, power-operated automatic entrances.
- B. Related Requirements:
 - 1. Section 087113 "Automatic Door Operators" for automatic door operators furnished separately from doors and frames.

1.3 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.
- B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
- C. Double-Egress Doors: A pair of doors that simultaneously swing with the two doors moving in opposite directions with no mullion between them.
- D. Double-Swing Doors: A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.
- E. IBC: International Building Code.
- F. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.
- G. For automatic door terminology, refer to BHMA A156.10 and BHMA A156.19 for definitions of terms.

1.4 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control automatic entrances. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing automatic entrances.

- C. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.
- D. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access-control system.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For automatic entrances.
 - 1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
 - 2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
 - 4. Indicate locations of activation and safety devices.
 - 5. Include hardware schedule and indicate hardware types, functions, quantities, and locations.
- C. Samples for Initial Selection: For units with factory-applied [color] [and] [metal-clad] finishes.
 - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Delegated-Design Submittal: For automatic entrances.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer and Certified Inspector.
- B. Product Certificates: For each type of automatic entrance. Include emergency-exit features of automatic entrances serving as a required means of egress.
- C. Product Test Reports: For each type of automatic entrance, for tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's special warranties.

1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For automatic entrances, safety devices, and control systems to include in operation and maintenance manuals.

1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer with company certificate issued by AAADM indicating that manufacturer has a Certified Inspector on staff.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project[and who employs a Certified Inspector].
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- C. Certified Inspector Qualifications: Certified by AAADM.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of operators, controls, and hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 AUTOMATIC ENTRANCE ASSEMBLIES

- A. Source Limitations: Obtain swinging automatic entrances from single source from single manufacturer.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Power-Operated Door Standard: BHMA A156.10.
- D. Power-Assist and Low-Energy Door Standard: BHMA A156.19.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design automatic entrances.
- B. Structural Performance: Automatic entrances shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Seismic Loads: As indicated on drawings.
 - 2. Wind Loads: As indicated on drawings.
- C. Windborne-Debris Impact Resistance: Automatic entrances shall pass large-missile-impact and cyclic-pressure tests of ASTM E 1996 according to the IBC for Wind Zone 2.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Operating Temperature Range: Automatic entrances shall operate within minus 20 to plus 122 deg F (minus 29 to plus 50 deg C).
- F. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. (6.4 L/s x sq. m) of fixed entrance-system area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- G. Opening Force:
 - 1. Power-Operated Doors: Not more than 50 lbf (222 N) required to manually set door in motion if power fails, and not more than 15 lbf (67 N) required to open door to minimum required width.
 - 2. Power-Operated Swinging Doors: Not more than 30 lbf (133 N) required to manually open door if power fails.
 - 3. Breakaway Device for Power-Operated Doors: Not more than 50 lbf (222 N) required for a breakaway door or panel to open.
 - 4. Power-Assist and Low-Energy Doors: Not more than 15 lbf (67 N) required to release a latch if provided, not more than 30 lbf (133 N) required to manually set door in motion, and not more than 15 lbf (67 N) required to fully open door if power fails.
 - 5. Accessible, Power-Assist Interior Doors: Not more than 5 lbf (22 N) to push or pull door to fully open position.
- H. Entrapment-Prevention Force:
 - 1. Power-Operated Swinging Doors: Not more than 40 lbf (178 N) required to prevent stopped door in the last 10 degrees of opening from moving in the direction of opening;

- not more than 30 lbf (133 N) required to prevent stopped door from moving in direction of closing.
2. Low-Energy Doors: Not more than 15 lbf (67 N) required to prevent stopped door from closing or opening.

2.3 SWINGING AUTOMATIC ENTRANCES

- A. General: Provide manufacturer's standard automatic entrances including doors, framing, headers, door operators, controls, and accessories required for a complete installation.
- B. Swinging, Power-Operated Automatic Entrance :
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Besam Entrance Solutions; Subsidiary of ASSA ABLOY Entrance Systems.
 - b. DORMA Automatics; Division of DORMA Group North America.
 - c. Horton Automatics; a division of Overhead Door Corporation.
 - d. Nabco Entrances Inc.
 - e. Stanley Access Technologies, LLC; Division of Stanley Security Solutions.
 - f. Tormax Technologies, Inc.
 - g. Or approved equal.
 2. Configuration: Pair of swinging doors with transom.
 - a. Traffic Pattern: Two way.
 - b. Mounting: Surface.
 3. Operator Features:
 - a. Power opening and power-assist spring closing.
 - b. Adjustable opening and closing speeds.
 - c. Adjustable hold-open time between zero and 30 seconds.
 - d. Adjustable backcheck and latching.
 - e. Obstruction recycle.
 - f. Automatic door re-open if stopped while closing.
 - g. On-off/hold-open switch to control electric power to operator, key operated.
 - h. <Insert features required>.
 4. Controls: Activation and safety devices as indicated on Drawings and according to BHMA standards.
 - a. Activation Device: Motion sensor mounted on ingress side of door header to detect pedestrians in activating zone and to open door.
 - b. Activation Device: Control mat installed on ingress side of door to detect pedestrians in activating zone and to open door.
 - c. Activation Device: Push-plate switch on each side of door]to activate door operator.
 - d. Safety Device: One photoelectric beam mounted in guide rails to detect pedestrians in presence zone and to prevent door from closing.
 5. Finish: Finish framing, door(s), and header with high-performance organic finish (two-coat fluoropolymer).

- a. Color: As selected by Architect from full range of industry colors and color densities.
- C. Swinging, Low-Energy, Power-Operated Automatic Entrance:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DORMA Automatics; Division of DORMA Group North America.
 - b. Horton Automatics; a division of Overhead Door Corporation.
 - c. Nabco Entrances Inc.
 - d. Tormax Technologies, Inc.
 - e. Or approved equal.
 - 2. Configuration: Pair of swinging door with transom.
 - a. Traffic Pattern: Two way.
 - b. Mounting: Surface.
 - 3. Operator Features:
 - a. Power opening and power-assist spring closing.
 - b. Adjustable opening and closing speeds.
 - c. Adjustable hold-open time between zero and 30 seconds.
 - d. Adjustable backcheck and latching.
 - e. Obstruction recycle.
 - f. Automatic door re-open if stopped while closing.
 - g. On-off/hold-open switch to control electric power to operator[, key operated].
 - h. <Insert features required>.
 - 4. Activation Device: Push-plate switch on each side of door to activate door operator.
 - 5. Finish: Finish framing, door(s), and header with high-performance organic finish (two-coat fluoropolymer).
 - a. Color: As selected by Architect from full range of industry colors and color densities.

2.4 ENTRANCE COMPONENTS

- A. Framing Members: Extruded aluminum, minimum 0.125 inch (3.2 mm) thick and reinforced as required to support imposed loads.
 - 1. Nominal Size: As indicated on Drawings.
 - 2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch (1.6-mm) wall thickness.
- B. Stile and Rail Doors: 1-3/4-inch- (45-mm-) thick, glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails.
 - 1. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - 2. Stile Design: As indicated on Drawings.

3. Rail Design: As indicated on Drawings.
- C. Sidelite(s) and Transom: As indicated on Drawings.
 1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.
- D. Headers: Fabricated from minimum 0.125-inch- (3.2-mm-) thick extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
 1. Mounting: Surface mounted.
- E. Brackets and Reinforcements: High-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- F. Signage: As required by cited BHMA standard.
 1. Application Process: Door manufacturer's standard process.

2.5 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 1. Extrusions: ASTM B 221 (ASTM B 221M).
 2. Sheet: ASTM B 209 (ASTM B 209M).
- B. Steel Reinforcement: Reinforcement with corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Use surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
- C. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, [Type 304] [Type 316] <Insert type>.
- D. Stainless-Steel Tubing: ASTM A 554, [Grade MT 304] [Grade MT 316] <Insert grade>.
- E. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, [Type 304] [Type 316] <Insert type>, stretcher-leveled standard of flatness, in entrance manufacturer's standard thickness.
- F. Brass Sheet: ASTM B 36/B 36M, Alloy UNS No. C26000 (cartridge brass, 70 percent copper), in entrance manufacturer's standard thickness.
- G. Bronze Sheet: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper) or Alloy UNS No. C23000 (red brass, 85 percent copper), in entrance manufacturer's standard thickness.
- H. Expanded Aluminum Mesh: [Expanded] [Expanded and flattened] aluminum sheet according to the geometry of ASTM F 1267.
- I. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on both surfaces.
- J. Glazing: As specified in [Section 088000 "Glazing."] [Section 088853 "Security Glazing."]

- K. Sealants and Joint Fillers: As specified in Section 079200 "Joint Sealants."
- L. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- M. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.6 DOOR OPERATORS AND CONTROLS

- A. General: Provide operators and controls, which include activation and safety devices, according to BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
- B. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.
 - 1. Door Operator Performance: Door operators shall open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
 - 2. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power off.
- C. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed by its plastic housing; adjustable to provide detection-field sizes and functions required by BHMA A156.10.
 - 1. Provide capability for switching between bidirectional and unidirectional detection.
 - 2. For one-way traffic, sensor on egress side shall not be active when doors are fully closed.
- D. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection-field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.
- E. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.
- F. Push-Plate Switch: Momentary-contact door-control switch with flat push-plate actuator with contrasting-colored, engraved message.
 - 1. Configuration: Rectangular push plate with 2-by-4-inch (50-by-100-mm) junction box.
 - a. Mounting: Surface mounted on wall, surface mounted on post.
 - 2. Push-Plate Material: Stainless steel.
 - 3. Message: International symbol of accessibility and "Push to Open."
- G. Key Switch: Recess-mounted, door-control switch with key-controlled actuator; enclosed in 2-by-4-inch (50-by-100-mm) junction box. Provide faceplate engraved with letters indicating switch functions.
 - 1. Face-Plate Material: Stainless steel.
 - 2. Functions: [Two-way automatic, hold open, one-way exit, off, full open, and partial open.
 - 3. Mounting: As indicated on Drawings.

- H. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.7 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish[unless otherwise indicated].
- B. Manual Opening for Power-Operated Swinging Doors: Provide hardware that, in a power failure, allows door to open with a manual force stipulated in "Performance Requirements" Article.
- C. Breakaway Device for Power-Operated Doors: Device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Maximum force to open door shall be as stipulated in "Performance Requirements" Article. Interrupt powered operation of door operator while in breakaway mode.
- D. Manual Opening for Power-Assist and Low-Energy Doors: Provide hardware that, in a power failure, allows door to open with a manual force as stipulated in "Performance Requirements" Article.
- E. Hinges:
 - 1. Center-Pivot Sets: BHMA A156.4, Grade 1, with exposed parts of cast-aluminum alloy.
 - 2. Offset Pivots: BHMA A156.4, Grade 1, with exposed parts of cast-aluminum alloy.
 - 3. Butt Hinges: BHMA A156.1, Grade 1, five-knuckle, 4-1/2-by-4-inch (114-by-102-mm) ball-bearing butts.
 - a. Provide nonremovable pins at hinges exposed on outside of door.
 - b. Provide nonferrous hinges for doors exposed to weather.
 - c. Provide three hinges at each leaf for doors up to 36 inches (914 mm) wide and 80 inches (2032 mm) tall; provide four hinges at each leaf for wider or taller doors.
- F. Deadlocks: Deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch- (25-mm-) long throw bolt; BHMA A156.5, Grade 1.
 - 1. Cylinders: As specified in Section 087111 "Door Hardware (Descriptive Specification)."]
 - a. Keying: Integrate into building master key system.
 - 2. Deadbolts: Laminated-steel hook, mortise type, BHMA A156.5, Grade 1.
 - 3. Two-Point Locking for Swinging Doors: Mechanism in stile of active door leaf that automatically extends second lockbolt into header.
- G. Push Bars: As specified in Section 087111.
- H. Pull Handles: As specified in Section 087111.
- I. Thresholds: BHMA A156.21, extruded-aluminum raised thresholds; with beveled edges with a slope of not more than 1:2 and a maximum height of 1/2 inch (13 mm). Provide cutouts as required for door operating hardware.
- J. Weather Stripping: Replaceable components.

1. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
2. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
3. Weather Sweeps: Nylon brush sweep mounted to underside of door bottom.

K. Finger Guards: Collapsible neoprene or PVC gasket.

2.8 ACCESSORIES

2.9 FABRICATION

- A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
1. Form aluminum shapes before finishing.
 2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws[, finished to match framing] [, fabricated from stainless steel].
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
 4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
1. Fabricate tubular and channel frame assemblies with welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 3. Form profiles that are sharp, straight, and free of defects or deformations.
 4. Provide components with concealed fasteners and anchor and connection devices.
 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 6. Fabricate exterior components to drain condensation and water passing joints within system to the exterior.
 7. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
 8. Allow for thermal expansion of exterior units.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

- D. Metal Cladding: Factory-fabricated and installed metal cladding, completely covering all visible surfaces as part of prefabricated entrance assembly before shipment to Project site.
 - 1. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 2. Form profiles that are sharp, straight, and free of defects or deformations.
 - 3. Provide components with concealed fasteners and anchor and connection devices.
 - 4. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 - 5. Fabricate exterior components to drain water passing joints and condensation and moisture occurring or migrating within system to the exterior.
 - 6. Allow for thermal expansion at exterior entrances.
- E. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- F. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."
- G. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
 - 1. Provide sliding-type weather stripping, mortised into door, at perimeter of doors[and breakaway sidelites].
 - 2. Provide compression-type weather stripping at fixed stops of exterior doors. At locations without fixed stops, provide sliding-type weather stripping retained in adjustable strip mortised into door edge.
 - 3. Provide weather sweeps mounted to underside of door bottoms of exterior doors.
 - 4. Provide finger guards at each swinging-door leaf that has clearance at hinge side greater than 1/4 inch (6 mm) and less than 3/4 inch (19 mm) with door in any position. Anchor guards to hinge-jamb frame.
- H. Controls:
 - 1. General: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.
 - 2. Install photoelectric beams in sides of guide rails, with dimension above finished floor not less than 24 inches (610 mm).

2.10 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm] or thicker.
- B. Color Anodic Finish: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm] [AA-M12C22A32/A34, Class II, 0.010 mm] or thicker.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
- D. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with [AAMA 2604] [AAMA 2605] and containing not less than [50] [70] percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- E. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than [50] [70] percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic entrance installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install automatic entrances according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.
 - 1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 - 2. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 - 3. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.
- B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.

2. Set headers, operating brackets, and guides level and true to location with anchorage for permanent support.
 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
 4. Provide thresholds [at exterior doors] [and] [where indicated].
- C. Door Operators: Connect door operators to electrical power distribution system.
- D. Access-Control Devices: Connect access-control devices to access-control system as specified in Section 281300 "Access Control."
- E. Controls: Install and adjust activation and safety devices according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel. Connect control wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- F. Glazing: Install glazing as specified in [Section 088000 "Glazing."] [Section 088853 "Security Glazing."]
- G. Sealants: Comply with requirements specified in Section 079200 "Joint Sealants" to provide weathertight installation.
1. Set thresholds, framing members, and flashings in full sealant bed.
 2. Seal perimeter of framing members with sealant.
- H. Signage: Apply signage on both sides of each door[and breakaway sidelite] as required by cited BHMA standard for direction of pedestrian travel.
- I. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 FIELD QUALITY CONTROL

- A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
1. Test and inspect each automatic entrance, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.
- C. Automatic entrances will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust hardware, moving parts, door operators, and controls to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.
1. Adjust exterior doors for weathertight closure.

- B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
- C. Occupancy Adjustments: When requested within [12] <Insert number> months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to [two] <Insert number> visits to Project during other-than-normal occupancy hours for this purpose.

3.5 CLEANING

- A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
 - 1. Comply with requirements in [Section 088000 "Glazing"] [Section 088853 "Security Glazing"] for cleaning and maintaining glass.

3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include [three] [six] [nine] [12] months' full maintenance by skilled employees of automatic entrance Installer. Include [monthly] [quarterly] preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.
 - 3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION 084229.33

SECTION 084523; 2-3/4" INSUL. TRANSLUCENT FIBERGLASS SANDWICH PANEL WALL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Flat insulated, translucent sandwich panels
 - 2. Aluminum clampite installation system
 - 3. Aluminum flashing

1.2 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.
- B. Submit shop drawings. Include plans, elevations, and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.
 - 1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
 - a. Sandwich panels: 7" x 12" units
 - b. Factory finished aluminum: 3" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
- E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Reports required (if applicable) are:
 - a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
 - b. Burn Extent (ASTM D 635)
 - c. Color Difference (ASTM D 2244)
 - d. Impact Strength (UL 972)
 - e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
 - f. Bond Shear Strength (ASTM D 1002)
 - g. Beam Bending Strength (ASTM E 72)
 - h. Insulation U-Factor (NFRC 100)
 - i. NFRC System U-Factor Certification (NFRC 700)
 - j. NFRC Visible Light Transmittance (NFRC 202)
 - k. Solar Heat Gain Coefficient (NFRC or Calculations)
 - l. Condensation Resistance Factor (AAMA 1503)
 - m. Air Leakage (ASTM E 283)
 - n. Structural Performance (ASTM E 330)
 - o. Water Penetration (ASTM E 331)

- p. Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)

1.3 CLOSEOUT SUBMITTALS

- A. Provide field maintenance manual to include in project maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
 - 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.
 - 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.
- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.5 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
 - 1. When requested, include span analysis data.
 - 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 - 3. Structural Loads. Provide system capable of handling the following loads:
 - a. Positive Wind Load (PSF): see drawings
 - b. Negative Wind Load (PSF): see drawings

Deflection Limits:

- 4. Walls and roof: Limited to L/120 of clear span for each assembly component.
- B. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

- A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within five years from the date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The approved manufacturer and basis of design for this specification is for products manufactured by; **KALWALL Corporation: Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com.** Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Structures Unlimited Inc.
- C. Distinctive Skylights Inc.

2.2 PANEL COMPONENTS

- A. Face Sheets:
 1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (eg. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
 2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 450 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1".
 - c. Class CCI
 3. Exterior face sheets:

- a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand-held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
 - c. Erosion Protection: Integral, embedded-glass erosion barrier.
 4. Appearance:
 - a. Exterior face sheet: Smooth, .070" thick and White in color.
 - b. Interior face sheet: Smooth, .045" thick and Crystal in color.
 - c. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- B. Grid Core:
 1. Thermally Broken Composite I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
 2. I-beam Thermal break: Minimum 1", thermoset fiberglass composite. Poured and de-bridged thermal break is not acceptable.
- C. Laminate Adhesive:
 1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.3 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
 1. Thickness: 2-3/4 inches
 2. Grid Core Insulation: Fill panel cores with fiberglass batt
 3. Panel U-factor by NFRC certified laboratory:
 - a. 2-3/4" thermally broken grid 0.23 "U"
 4. Complete insulated panel system shall have NFRC certified U-factor of 0.30
 5. Visible Light Transmittance (VLT):
 - a. Visible LT (NFRC 202) by NFRC certified laboratory: 26%.
 6. Solar heat gain coefficient 25
 7. Grid pattern as viewed: Nominal size: 24" x 12" reverse shoji grid pattern
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.

- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
 - 1. Absence of flame penetration through the wall assembly at any time.
 - 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
 - 3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Thermally broken, insulated panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

2.4 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clampite installation system:
 - 1. Thermal Strut System-Flat Thermally Broken closure system: Thermal barrier shall consist of polyamide thermal strut construction with multi-directional glass fiber reinforcing. Aluminum components shall be mechanically crimped into cross knurled cavities. Poured and de-bridged thermal break is not acceptable.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clampite installation system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum clampite installation system, excluding final fasteners to the building.
- D. Finish:
 - 1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's full range of standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure, and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.
 - 2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.
 - 1. Anchor component parts securely in place by permanent mechanical attachment system.
 - 2. Accommodate thermal and mechanical movements.
 - 3. Seal aluminum clampite installation system as shown on the manufacturer's fabrication drawings and suggested installation instructions.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.4 FIELD QUALITY CONTROL

- A. Water Test: Installer to test a representative section of installed materials according to procedures in AAMA 501.2.
- B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.5 CLEANING

- A. Clean the panel system, interior and exterior, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

SECTION 084525; 4" TRANSLUCENT FIBERGLASS SANDWICH PANEL OPEN CANOPY SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Sloping, translucent sandwich panels
 - 2. Aluminum clampite installation system
 - 3. Aluminum flashing

1.2 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.
- B. Submit shop drawings. Include plans, elevations, and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.
 - 1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
 - a. Sandwich panels: 7" x 12" units
 - b. Factory finished aluminum: 3" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
- E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Reports required (if applicable) are:
 - a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
 - b. Burn Extent (ASTM D 635)
 - c. Color Difference (ASTM D 2244)
 - d. Impact Strength (UL 972)
 - e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
 - f. Bond Shear Strength (ASTM D 1002)
 - g. Beam Bending Strength (ASTM E 72)
 - h. Insulation U-Factor (NFRC 100)
 - i. NFRC System U-Factor Certification (NFRC 700)
 - j. NFRC Visible Light Transmittance (NFRC 202)
 - k. Solar Heat Gain Coefficient (NFRC or Calculations)
 - l. Fire Penetration of Exterior Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)
 - m. Fall Through Resistance (ASTM E 661)
 - n. Class A Roof Covering Burning Brand (UL 790)
 - o. UL Listed Class A Roof System (UL 790) – Submit UL Card

1.3 CLOSEOUT SUBMITTALS

- A. Provide field maintenance manual to include in project maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
 - 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.
 - 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.
- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.5 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
 - 1. When requested, include span analysis data.
 - 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 - 3. Structural Loads. Provide Canopy system capable of handling the following loads:
 - a. Live Load (PSF): see drawings
 - b. Snow Load (PSF): see drawings
 - c. Drift Load (PSF): see drawings
 - d. Wind Load (PSF): see drawings
- B. Deflection Limits:
 - 1. Canopy: Limited to L/60 of clear span for each assembly component.
- C. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

- A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within five years from the date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The approved manufacturer and basis of design for this specification is for products manufactured by: **KALWALL Corporation: Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com.** Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Structures Unlimited Inc.
- C. Distinctive Skylights Inc.

2.2 PANEL COMPONENTS

- A. Face Sheets:
 - 1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
 - 2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 15 or less for canopies and smoke developed no greater than 450 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1".
 - c. UL Listed Class A/Type A - CCI
 - 3. Exterior face sheets:
 - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 3 years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a

- protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand-held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
 - c. Erosion Protection: Integral, embedded-glass erosion barrier.
 - 4. Appearance:
 - a. Exterior face sheet: Smooth, .070" thick and Crystal in color.
 - b. Interior face sheet: Smooth, .045" thick and White in color.
 - c. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- B. Grid Core:
- 1. Aluminum I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
- C. Laminate Adhesive:
- 1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
 - 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 - 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.3 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
- 1. Thickness: 2-3/4 inches
 - 2. Grid Core Insulation: Fill panel cores with air.
 - 3. Panel U-factor by NFRC certified laboratory: 2-3/4" aluminum grid **0.53**
 - 4. Complete insulated panel system shall have NFRC certified U-factor of 0.56
 - 5. Visible Light Transmittance (VLT):
 - a. Visible LT (NFRC 202) by NFRC certified laboratory: 35%
 - 6. Solar heat gain coefficient: 0.27
 - 7. Grid pattern as viewed: Nominal size: 12" x 24" shoji grid pattern
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.
- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Assemblies Using a Direct Flame Impingement Exposure:
- 1. Absence of flame penetration through the assembly at any time.
 - 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.

3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Canopy System:
1. Canopy system shall pass Class A Roof Burning Brand Test by UL 790.
 2. Canopy system shall be UL listed as a Class A Roof by UL 790, which requires periodic unannounced factory inspections and retesting by Underwriters Laboratories.
- E. Canopy System shall meet the fall through requirements of OSHA 1910.21 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.

2.4 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clampite installation system Canopy:
1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
 2. Canopy perimeter aluminum clampite installation system at curbs shall be factory sealed to panels.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clampite installation system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum clampite installation system, excluding final fasteners to the building.
- D. Finish:
1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's full range of standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure, and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.
 2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.
 - 1. Anchor component parts securely in place by permanent mechanical attachment system.
 - 2. Accommodate thermal and mechanical movements.
 - 3. Seal aluminum clampite installation system as shown on the manufacturer's fabrication drawings and suggested installation instructions.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.5 CLEANING

- A. Clean the panel system, interior and exterior, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes fixed aluminum-framed windows for exterior locations.
- B. Related Sections include the following:
 - 1. Division 08 Section "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units.
 - 2. Division 08 Section "Glazing" for additional glazing requirements for aluminum windows.

1.3 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA/CSA 101/I.S.2/A440-17:
 - 1. AW: Architectural.
- B. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440-17:
 - 1. Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size) or as specified elsewhere in this section, whichever is more stringent. Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class. Downsized test reports will not be considered acceptable.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
 - 1. Fixed Windows: 60" x 99".

- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units of the minimum test size specified herein that pass AAMA/WDMA/CSA 101/I.S.2/A440-17, Uniform Load Structural and Uniform Load Deflection Tests:
 - 1. Uniform Load Structural Test: 225 psf (positive and negative).
 - 2. Uniform Load Deflection Test: 150 psf (positive and negative).

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
 - 1. Mullion details, including reinforcement and stiffeners.
 - 2. Joinery details.
 - 3. Weather-stripping details.
 - 4. Thermal-break details.
 - 5. Glazing details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
 - 1. Include similar samples of hardware and accessories involving color selection.
- D. Maintenance Data: For finishes to be included in maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

- A. Product Qualifications: In order to confirm that the proposed product(s) conform to the material and performance requirements contained in these specifications, bidders shall include the following with their bid. Failure to comply with these requirements shall cause the bid to automatically be rejected.
 - 1. Bidder's Acknowledgement: Bidders shall include a letter in their bid stating the manufacturer and series (model) number of the product upon which its bid has been based. Changes in product (manufacturer or series) will not be permitted after the bid.
 - 2. Product Data: Bidders submitting bids based on products other than the Basis of Design product listed in Paragraph 2.1 must also include the following with their bid:
 - a. Comprehensive test reports not more than four years old prepared by a qualified testing agency for each product type being used on the project demonstrating compliance with the air, water and structural requirements

- outlined herein. Test reports based on the use of downsized test units will not be accepted.
- b. Thermal simulations prepared by a qualified independent testing agency for each product type being used on the project demonstrating compliance with the thermal transmittance requirements outlined in Paragraph 2.3.
 - c. Full size product details showing all frame and sash details, dimensions, thermal break construction, wall thicknesses and joinery. Details must accurately reflect all glazing and hardware options specified herein.
- B. Product Requirements: For maximum performance, windows for this project must meet both the testing requirements as contained herein and the minimum material requirements specified. Windows that carry the applicable AAMA rating but do not meet the material thicknesses, depths, etc. shall not be acceptable for use on this project.
- C. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
- D. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Do not modify size and dimensional requirements.
- 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- F. Fenestration Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440-17, "Standard/Specification for Windows, Doors, and Unit Skylights" for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
- G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.
- H. Preinstallation Conference: If requested, conduct conference at project site to review methods and procedures related to aluminum windows including, but not limited to, the following:
- 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components.
 - 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.7 PROJECT CONDITIONS

- A. Field Measurements: For retrofit installations, verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, or air infiltration.
 - c. Deterioration of metals or other materials beyond that which is normal.
 - d. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Window: Five years from date of Substantial Completion.
 - b. Insulated Glazing: 10 years from date of Substantial Completion.
 - c. Painted Metal Finishes:
 - 1) Five years from date of Substantial Completion for AAMA 2603 Baked Enamel Finishes.
 - 2) Fifteen years from date of Substantial Completion for AAMA 2605 Superior Performance Finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The basis of design for these specifications is the Series 7700i Fixed as manufactured by Architectural Window Manufacturing Corporation, Rutherford, New Jersey.
- B. Equivalents: Subject to compliance with all material and performance requirements outlined in these specifications, "or equal" products by other manufacturers will be considered for use subject to review by the Architect. The Architect's decision regarding equivalency is final.

2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, not less than 16,000-psi (110-MPa) minimum yield strength, and not less than 0.080-inch (1.6-mm) thickness at any location for the main frame.
- B. Frame Depth: 4 ¼" minimum frame depth.
- C. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
 - 1. All fasteners must be concealed except where unavoidable for application of hardware.
 - 2. For application of hardware, where required, use non-magnetic stainless steel phillips machine screws.
- D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- E. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.
 - 1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- F. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.
 - 1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.
- G. Replaceable Weather Seals: Comply with AAMA 701/702.
- H. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.3 WINDOW

- A. Window Type: Fixed
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440-17.

1. Performance Class and Grade: AW-PG150.
- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a minimum CRF of 62.
- D. Thermal Transmittance: Provide aluminum windows with whole-window U-factor and SHGC maximums indicated when simulated in accordance with NFRC 100 and NFRC 200 at a model size of 47" x 59" and glazed with 1" Argon filled sputter coat Low-E (#2) insulated glass using a warm edge spacer.
 1. U-Factor: 0.32 Btu/sq. ft. x h x deg F or less.
 2. SHGC: 0.33.
- E. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-17, Air Infiltration Test.
 1. Maximum Rate: <0.01 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- F. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.
 1. Test Pressure: 20 percent of positive design pressure, but not more than 25 lbf/sq. ft.
- G. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.

2.4 INSULATED GLAZING

- A. Construction: All windows (except those receiving insulated panels) shall be factory glazed with hermetically sealed 1" insulating glass units with a dual seal of polyisobutylene and silicone and a desiccant filled spacer. Insulated glass must be set into a continuous bed of two-part structural silicone sealant and held in place with removable extruded aluminum snap-in beads. Wrap around (marine) glazing which requires the removal and disassembling of the sash for re-glazing will not be acceptable. Units must be IGCC certified for a CBA rating level.
 1. Exterior Glazing:
 - a. Thickness: 1"
 - b. Tint: Clear
 - c. Type: Tempered Glass
 - d. Coating: Guardian SuperNeutral 68, Vitro Solarban 60, Viracon VE-2M Low-E (or equal) (#2 Surface)
 2. Interior Glazing:
 - a. Thickness: 1"
 - b. Tint: Clear
 - c. Type: Tempered Glass
 3. Interspace Content: Argon

4. Spacer Type: Warm Edge

2.5 HARDWARE

- A. General: Not applicable.

2.6 INSECT SCREENS

- A. General: Not applicable.

2.7 ACCESSORIES

- A. Rescue Labels: Not applicable.

2.8 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling framing.
- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
 2. No thermal short circuits shall occur between the exterior and interior.
 3. The thermal barrier shall be INSULBAR® or equal and shall consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
 4. Poured and debridged urethane thermal barriers shall not be permitted.
- D. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- E. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch- thick extruded aluminum. Finish to match window units. Provide subframes capable of withstanding design loads of window units.

- F. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.
- H. Muntins: Where shown on drawings, muntins shall be 3/8" deep profiled extruded aluminum applied to the exterior of 1" deep insulating glass. Roll formed muntins shall not be acceptable. Exterior applied muntins, where applicable, must be pinned to an integral bevel on the frame or sash. Products using applied bevels will not be accepted.

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Exterior of Window:
 - 1. Superior-Performance Organic Finish: AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturer's written instructions.
 - a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - b. Color: As selected by Architect from manufacturer's standard non-mica, non-exotic, non-metallic colors. (Note: Exterior color may be different from interior color.)
- D. Interior of Window:
 - 1. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603.

- b. Color: As selected by Architect from manufacturer's standard non-mica, non-exotic, non-metallic colors. (Note: Exterior color may be different from interior color.)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
 - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FACTORY TESTING

- A. One window for each seventy-five manufactured shall be randomly selected by the Owner and Architect to be tested at the manufacturer's facility for air and water infiltration in order to confirm compliance of the project's windows with the performance requirements contained in these specifications. Bidders are to include the cost of

transportation, food, and lodging for four representatives of the Owner and/or Architect to witness these tests.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: If desired, Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502, Test Method A. Field test pressures and allowable limits shall be as factored by AAMA 502 from those minimums required to determine laboratory compliance with the applicable Performance Class and Grade pursuant to AAMA/WDMA/CSA 101/I.S.2/A440-17.
 - 2. Testing Extent: One window as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested immediately after installation.
 - 3. Test Reports: Shall be prepared according to AAMA 502.
- C. Remediate noncomplying windows and retest as specified above.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of remediated doors or additional work with specified requirements.

3.5 ADJUSTING, CLEANING, AND PROTECTION

- A. Manufacturer shall clean all glass and aluminum prior to shipment.
- B. Protection of newly installed windows and/or final cleaning of glass and aluminum to remove any accumulations that may have occurred during the construction period is to be the responsibility of the General Contractor or Owner.
- C. Comply with manufacturer's written recommendations for final cleaning and maintenance.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to maintain window system.

END OF SECTION 085113

SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

PART 1 - GENERAL

1.1 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. Products furnished, but not installed, under this Section include the products listed below. Coordinating and scheduling the purchase and delivery of these products remain requirements of this Section.

1. Thresholds weather stripping to be installed under other Sections.
2. Permanent lock cores to be installed by Owner.

1.2 ACTION SUBMITTALS

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

B. Shop Drawings: Details of electrified door hardware.

C. Samples: For each exposed product and for each color and texture specified.

D. 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. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. 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.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Door Hardware: One additional item.
 2. Electrical Parts: One item for each replaceable part.

1.4 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.
- 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, and who is also an Electrified Hardware Consultant (EHC) .
- C. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
- 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: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines ICC/ANSI A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (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 and 3/4 inch (19 mm) high for exterior sliding doors.
 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- I. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- B. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.6 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. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Electromagnetic Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Five years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Articles to comply with requirements in this Section.
 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
 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 descriptive titles corresponding to requirements specified in Part 2.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Baldwin Hardware Corporation.
- b. Bommer Industries, Inc.
- c. Cal-Royal Products, Inc.
- d. Hager Companies.
- e. IVES Hardware; an Ingersoll-Rand company.
- f. Lawrence Hardware Inc.
- g. McKinney Products Company; an ASSA ABLOY Group company.
- h. PBB, Inc.
- i. Stanley Commercial Hardware; Div. of The Stanley Works.

- B. Antifriction-Bearing Hinges:

- 1. Mounting: Full mortise (butts).
- 2. Bearing Material: Ball bearing.
- 3. Grade: Grade 2 .
- 4. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pinads.
 - b. Interior Hinges: Brass with stainless-steel pin body and brass protruding heads.
 - c. Hinges for Fire-Rated Assemblies: Stainless steel with stainless-steel pin.
- 5. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Nonremovable.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
- 6. Tips: Flat button.
- 7. Corners: Square.
- 8. Options: Raised barrel.

- C. Electrified Antifriction-Bearing Hinges: Full-mortise mounting.

- 1. Bearing Material: Manufacturer's standard antifriction bearing.
- 2. Grade: Grade 1 (heavy weight).
- 3. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pin.
 - b. Interior Hinges: Brass with stainless-steel pin body and brass protruding heads.
 - c. Hinges for Fire-Rated Assemblies: Stainless steel with stainless-steel pin.

4. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Nonremovable.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
5. Tips: Flat button.
6. Corners: Square.
7. Options: Raised barrel.
8. Electric Option: Concealed electric through wires.

D. Plain-Bearing Hinges: Grade 3 (standard weight).

1. Mounting: Full mortise (butts)
2. Base and Pin Metal: Brass with stainless-steel pin body and brass protruding heads.
3. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Corridor Doors with Locks: Nonremovable.
4. Tips: Flat button.
5. Corners: Square.
6. Options: Raised barrel.

E. Electrified Plain-Bearing Hinges: Grade 3 (standard weight); full-mortise mounting.

1. Mounting: Full mortise (butts).
2. Pins: Non-rising loose unless otherwise indicated
 - a. Outswinging Corridor Doors with Locks: Nonremovable.
3. Tips: Flat button.
4. Corners: Square.
5. Options: Raised barrel.
6. Electric Option: Concealed electric through wires.

F. Swing-Clear Hinges: Reversible.

1. Mounting: Full mortise (butts).
2. Bearing, and Grade: Antifriction bearing, Grade 1 (heavy weight).
3. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Nonremovable.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
4. Tips: Flat button.
5. Corners: Square.
6. Options: Raised barrel.

2.3 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Baldwin Hardware Corporation.
- b. Bommer Industries, Inc.
- c. Cal-Royal Products, Inc.
- d. Hager Companies.
- e. Lawrence Hardware Inc.
- f. McKinney Products Company; an ASSA ABLOY Group company.
- g. PBB, Inc.
- h. Stanley Commercial Hardware; Div. of The Stanley Works.

- B. Spring Hinges: Grade 1; wrought steel, with torsion spring.

1. Type: Single acting.
2. Mounting: Full mortise (butts)

- C. Horizontal-Spring Pivot Sets: Grade 3; double acting; non-handed; consisting of wrought steel bottom pivot hinge with antifriction bearing and nylon top pivot and socket.

1. Type: Non-hold open.
2. Tension: Adjustable.
3. Bottom Pivot Trim: Brass.
4. Bottom Plate: For bottom hinge attachment to floor.

- D. Gate-Spring Pivot Sets: Grade 1; double acting; non-handed; consisting of bottom pivot with door and jamb bracket and top pivot assembly with jamb bracket.

1. Mounting: Mortise.
2. Tension: Adjustable.
3. Base Metal: Cast, forged, or extruded brass or bronze.

- E. Gravity Pivot Sets: Grade 3; double acting; surface mounting; non-handed; consisting of bottom pivot with door and jamb bracket and top pivot assembly with jamb bracket.

1. Tension: Adjustable.
2. Base Metal: Wrought brass or bronze.

2.4 CENTER-HUNG AND OFFSET PIVOTS

- A. Center-Hung and Offset Pivots: BHMA A156.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. DORMA Architectural Hardware; Member of The DORMA Group North America.
- b. IVES Hardware; an Ingersoll-Rand company.
- c. Rixson Specialty Door Controls; an ASSA ABLOY Group company.

- B. Center-Hung Pivot Sets: Grade 1.

1. Top Pivots: Walking-beam type with retractable pin and oil-impregnated bronze bearing; mortised into door and frame.
2. Bottom Pivots: Recessed in floor in cement case.
3. Base Metal: Brass.

C. Offset Pivot Sets: Grade 1.

1. Offset: 3/4 inch (19 mm)
2. Top Pivot: Full-mortise mounting; walking-beam type with retractable pin and oil-impregnated bronze bearing.
 - a. Knuckle: Standard.
3. Bottom Pivot: Recessed in floor in cement case, and mortised into door; with thrust ball bearing.
4. Base Metal: Brass.

D. Offset Intermediate Pivots: Grade 1; for use with offset pivot sets; with oil-impregnated bronze bearings.

1. Mounting: Full mortise, 3/4 inch (19 mm) offset.
2. Knuckle: Standard.
3. Base Metal: Brass.

E. Pocket Pivots: Grade 1; full-mortise mounting; non-handed; allows door to nest in pocket with door surface flush with corridor wall when open; maximum 90-degree swing.

1. Base Metal: Bronze.

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. Pin-and-Barrel-Type Hinges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Lawrence Hardware Inc.
 - d. Markar Architectural Products, Inc.; a subsidiary of Adams Rite Manufacturing Co.
 - e. McKinney Products Company; an ASSA ABLOY Group company.
 - f. Select Products Limited.
 - g. Zero International.
2. Grade: Grade 1-150.
3. Exterior Hinges: Stainless steel.
4. Interior Hinges: Stainless steel.

5. Hinges for Fire-Rated Assemblies: Stainless steel with steel fire pins to hold fire-rated doors in place if required by tested listing.
 6. Type: Full surface with removable continuous caps over fasteners
- C. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bommer Industries, Inc.
 - b. Cal-Royal Products, Inc.
 - c. Hager Companies.
 - d. IVES Hardware; an Ingersoll-Rand company.
 - e. McKinney Products Company; an ASSA ABLOY Group company.
 - f. Select Products Limited.
 - g. Stanley Commercial Hardware; Div. of The Stanley Works.
 - h. Zero International.
 2. Grade: Grade 1-150.
 3. Hinges for Fire-Rated Assemblies: With steel fire pins to hold fire-rated doors in place if required by tested listing.
 4. Mounting: Full surface, with removable continuous caps over fasteners.

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).
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- D. Lock Trim:
1. Description: As indicated on Drawings.
- 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.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Falcon Lock; an Ingersoll-Rand company.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.
 - m. Yale Security Inc.; an ASSA ABLOY Group company.

G. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. Cal-Royal Products, Inc.
 - f. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - g. Falcon Lock; an Ingersoll-Rand company.
 - h. Marks USA.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Yale Security Inc.; an ASSA ABLOY Group company.

2.7 AUXILIARY LOCKS

A. Bored Auxiliary Locks: BHMA A156.5: Grade 1; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Falcon Lock; an Ingersoll-Rand company.

- e. Hager Companies.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.
 - m. Yale Security Inc.; an ASSA ABLOY Group company.
- 2. Backset: 2-3/8 inches (60 mm).
 - 3. Material: Stainless steel.
 - 4. Deadlatches: Deadlocking latchbolt operated by key outside and turn inside.
 - 5. Deadlocks: Deadbolt operated by key outside and turn inside.
- B. Mortise Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - f. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - g. Yale Security Inc.; an ASSA ABLOY Group company.
 - 2. Backset: 2-3/8 inches (60 mm).
 - 3. Material: Stainless steel.
 - 4. Deadlocks: Deadbolt operated by key outside and turn inside.
 - 5. Deadlatches: Latchbolt and auxiliary deadlatch operated by key outside and turn inside.
 - 6. Deadlocks for Sliding Doors: Expanding- or interlocking-type deadbolt operated by key outside and turn inside.
 - 7. Deadlatches for Sliding Doors: Hook-type latchbolt operated by key outside and handle inside.
- C. Narrow Stile Auxiliary Locks: BHMA A156.5; Grade1; with strike that suits frame.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - 2. Backset: 1.125 inches (29 mm).
 - 3. Strike: Flat.
 - 4. Case Material: Stainless steel.
 - 5. Armored Front and Strike Material: Stainless steel.
 - 6. Deadlock: Deadlocking bolt.

- a. Operation: Key outside and operating trim inside.
 - b. Door Application: Sliding door.
- 7. Deadlatch: Latchbolt with auxiliary deadlatch operated by key outside and paddle or lever inside; for single swinging doors.
- 8. Multipoint Lock: Deadlocking bolt for pairs of swinging doors.
 - a. Operation: Key outside and turn, lever, or knob inside.
 - b. Type: Two point.
- 9. Latch/Lock: Deadbolt and latchbolt; both operated by key both sides; inside handle operates only latchbolt.
- D. Push-Button Combination Locks: BHMA A156.5; Grade 1; 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.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Kaba Ilco Corp.; a Kaba Group company.
 - 2. Lockset Configuration: Standard with inside push button.
 - 3. Auxiliary Lock Configuration: Deadbolt.
 - 4. Override: By key cylinder.

2.8 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.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Door Controls International, Inc.
 - b. Dortronics Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - g. Security Door Controls.
 - 2. Direct-Hold Type: Lock mounted on side of jamb; strike flush mounted on door push side.
 - 3. Strength Ranking: 1000 lbf (4448 N).
 - 4. Inductive Kickback Peak Voltage: Not more than 53 V.
 - 5. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.
 - 6. Options:

- a. Magnetic bond sensor.
 - b. Continuous housing for full width of door.
 - c. Continuous housing for full height of door.
 - d. Single LED indicators.
 - e. Double LED indicators.
 - f. Adjustable time delay with automatic relock.
 - g. Integral door position switch.
 - h. <Insert option>.
- 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.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Door Controls International, Inc.
 - b. Doorguard Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
2. Grade: Security Grade, activated from secure side of door by initiating device.

2.9 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade [1] [2]; motor or solenoid driven; mortise latchbolt; with strike that suits frame.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Brink, R. R., Locking Systems, Inc.
 - c. DynaLock Corp.
 - d. Marks USA.
 - e. Rutherford Controls Int'l. Corp.
 - f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - g. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - h. Security Door Controls.
 - i. Yale Security Inc.; an ASSA ABLOY Group company.

2.10 SELF-CONTAINED ELECTRONIC LOCKS

- A. Self-Contained Electronic Locks: BHMA A156.25, 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.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Kaba Ilco Corp.; a Kaba Group company.
 - c. Marks USA.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Yale Security Inc.; an ASSA ABLOY Group company.
2. Actuating Device: Digital keypad.
3. Faceplate Material: Stainless steel.
4. Trim: Match trim specified for mechanical locks.
5. Function: Latch with key.

2.11 EXIT LOCKS AND EXIT ALARMS

A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Detex Corporation.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

B. Exit Locks: Surface mounted; battery powered, housed in metal case; with manufacturer's standard strike that suits frame; with red-and-white lettering reading "EMERGENCY EXIT PUSH TO OPEN--ALARM WILL SOUND."

1. Single-Door Type: Activated by horizontal bar.
2. Options:
 - a. Low-battery alert.
 - b. Outside key control.
 - c. Audible alarm that sounds when unauthorized use of door occurs.
 - d. Silent alarm with remote signal capability for connection to remote indicating panel.
 - e. Strike: Mortise.

C. Stand-Alone Exit Alarms: Mounted separate from door and activated by door movement switch.

1. Options:
 - a. Low-battery alert.
 - b. Outside key control.
 - c. Audible alarm that sounds when unauthorized use of door occurs.

- d. Automatic rearming after authorized use, with adjustable time delay.
- e. Remote signal capability for connection to remote indicating panel.

2.12 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Door Controls International, Inc.
 - d. IVES Hardware; an Ingersoll-Rand company.
 - e. Trimco.

B. Half-Round Surface Bolts: Grade 1, 6-inch (152-mm) polished-brass or burnished-steel, half-round rod and knob; minimum 7/8-inch (22-mm) throw; with universal strike.

2.13 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Burns Manufacturing Incorporated.
 - c. Don-Jo Mfg., Inc.
 - d. Door Controls International, Inc.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; an Ingersoll-Rand company.
 - g. Trimco.

B. Manual-Extension Flush Bolts: Grade 1, fabricated from extruded brass or aluminum, with 12-inch (305-mm) rod actuated by flat lever; listed and labeled for fire-rated doors. Provide with matching dustproof strike.

C. Slide Flush Bolts: Grade 1, cast brass, with rod actuated by slide. Provide with matching dustproof strike.

D. Tubular Bolts: Grade 1, polished-brass or polished-bronze, oval turn knob and escutcheon; minimum 9/16-inch (14-mm) steel bolt with 1/2-inch (13-mm) throw. Provide with matching dustproof strike.

E. Dustproof Strikes: Locking type, Grade 1, polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.

2.14 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.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
- a. Cal-Royal Products, Inc.
 - b. Door Controls International, Inc.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Trimco.
- B. Automatic Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically retract when active leaf is opened and that automatically engage when active door depresses bolt trigger[; listed and labeled for fire-rated doors]. Provide brass or stainless-steel cover plate, top and bottom [matching] [dustproof] strikes, guides, guide supports, wear plates, and shims.
- C. Self-Latching Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically engage when active door depresses trigger[; listed and labeled for fire-rated doors]. Bolts are manually retracted by a slide in the bolt face. Provide brass or stainless-steel cover plate, [matching] [dustproof] top and bottom strikes, guides, guide supports, wear plates, and shims.
- D. Dustproof Strikes: Locking type, Grade 1, polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.

2.15 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Arrow USA; an ASSA ABLOY Group company.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Detex Corporation.
 - f. Door Controls International, Inc.
 - g. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - h. Dor-O-Matic; an Ingersoll-Rand company.
 - i. K2 Commercial Hardware; a Black & Decker Corp. company.
 - j. Monarch Exit Devices & Panic Hardware; an Ingersoll-Rand company.
 - k. Precision Hardware, Inc.; Division of Stanley Security Solutions, Inc.
 - l. Rutherford Controls Int'l. Corp.
 - m. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - n. Von Duprin; an Ingersoll-Rand company.
 - o. Yale Security Inc.; an ASSA ABLOY Group company.

- B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- C. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- D. Rim Exit Devices: Grade 1.
 - 1. Type: Type 1, rim.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- E. Mortise Exit Devices: Grade 1.
 - 1. Type: Type 3.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- F. Surface Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: Type 2.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Configuration: Top and bottom rods.
 - 6. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- G. Concealed Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: Type 6, narrow stile.

2. Grade: Grade 1.
3. Actuating Bar: Cross bar.
4. Material: Stainless steel
5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
 - f. <Insert option>.

H. Combination Exit Devices: Grade 1.

1. Type Type 12, mortise and concealed vertical rod.
2. Grade: Grade 1.
3. Actuating Bar: Cross bar
4. Material: Stainless steel.
5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
 - f. <Insert option>.

I. Automatic Latching Two-Point Bolts: Grade 1.

1. Type: Type 24, surface.
2. Material: Stainless steel.

J. Extension Flush Bolt Sets: BHMA A156.3; Grade 1.

1. Type: Type 27, self-latching.
2. Material: Stainless steel.

K. Electronic Exit Bars: Nonlatching electronic actuating (releasing) device activated by an adjustable capacitance sensor and with no moving parts; listed and labeled as panic exit hardware. Fabricate bar from extruded aluminum, and provide door and frame transfer device and 16 feet (4.9 m) of cord to route wiring off the door frame.

L. Exit Device Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.

1. Match design for lock trim, unless otherwise indicated.

2.16 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Arrow USA; an ASSA ABLOY Group company.
- b. ASSA, Inc.; an ASSA ABLOY Group company.
- c. Best Access Systems; Div. of Stanley Security Solutions, Inc.
- d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
- e. Falcon Lock; an Ingersoll-Rand company.
- f. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
- g. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
- h. Schlage Commercial Lock Division; an Ingersoll-Rand company.
- i. Yale Security Inc.; an ASSA ABLOY Group company.

- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are interchangeable ; face finished to match lockset.

1. Number of Pins: Seven.
2. Type: Mortise type.

- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type M, mechanical; permanent cores that are removable; face finished to match lockset.

1. Number of Pins: Seven.
2. Type: Mortise.

- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.17 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: Brass.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

- a. Notation: Information to be furnished by Owner.
- 2. 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.

2.18 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 50 percent of the number of locks.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Key Boxes and Cabinets.
 - b. GE Security, Inc.
 - c. HPC, Inc.
 - d. Lund Equipment Co., Inc.
 - e. MMF Industries.
 - f. Tri Palm International.
 - 2. 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.
 - 3. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
 - 4. Portable Cabinet: Tray for mounting in file cabinet, equipped with key-holding panels, envelopes, and cross-index system.

2.19 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Forms + Surfaces.
 - d. Hager Companies.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; An Ingersoll-Rand Company.
 - g. Rockwood Manufacturing Company.
 - h. Trimco.
 - i. Dorma.

- B. Flat Push Plates: 0.050 inch (1.3 mm), 4 inches wide by 16 inches high (102 mm wide by 406 mm high) with square corners and beveled edges; secured with exposed screws.
- C. Straight Door Pulls: With minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Type: 3/4-inch (19-mm) constant-diameter pull.
 - 2. Mounting: Back to back with threaded sleeves.
 - 3. Overall Length: 9 inches (229 mm).
- D. Offset Door Pulls: 1-inch (25-mm constant-diameter pull with minimum clearance of 2-1/4 inches (57 mm) from face of door and offset of 2 inches (51 mm).
 - 1. Mounting: Back to back with threaded sleeves.
 - 2. Overall Length: 9 inches (229 mm).
- E. Flush Door Pulls: Mortised 1/2 inch (13 mm) deep; secured with screws.
 - 1. Shape: Rectangular with rectangular recess.
 - 2. Size: 3-1/2 inches wide by 4-3/4 inches high (89 mm wide by 121 mm high).
- F. Straight Pull-Plate Door Pulls: 0.050-inch- (1.3-mm-) thick plate, 4 inches wide by 16 inches high (102 mm wide by 406 mm high) with square corners and beveled edges; pull with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Type: 3/4-inch (19-mm) constant-diameter pull.
 - 2. Mounting: Surface applied with concealed fasteners.
 - 3. Overall Pull Length: 9 inches (229 mm).
- G. Offset Push-Pull Door Pulls: 0.050-inch- (1.3-mm-) thick plate, 4 inches wide by 16 inches high (102 mm wide by 406 mm high) with square corners and beveled edges; 1-inch (25-mm) constant-diameter pull with minimum clearance of 2-1/4 inches (57 mm) from face of door and offset of 2 inches (51 mm).
 - 1. Overall Pull Length: 9 inches (229 mm).
- H. Single Push Bar: Horizontal bar, with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Shape and Size: 1-inch (25-mm) constant-diameter round bar.
 - 2. Mounting: Through bolted with oval-head machine screws and countersunk washers.
- I. Double Pull Bar: Two horizontal bars connected by matching vertical pull bar and spaced at 8 inches (200 mm) o.c.; with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Shape and Size: 1-inch (25-mm) constant-diameter round bars.
 - 2. Mounting: Through bolted with oval-head machine screws and countersunk washers.

2.20 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; and with internal override.

- 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. Flat Overlapping Astragals: BHMA A156.22; flat stainless steel metal bar, surface mounted on face of door with screws; minimum 1/8 inch (3.2 mm) thick by 2 inches (51 mm) wide by full height of door.
- D. Rigid, Housed Astragals: BHMA A156.22; gasket material held in place by metal housing; fastened to face of door with screws.
 - 1. Gasket Material: Neoprene.
 - 2. Housing Material: Aluminum.
- E. Overlapping-with-Gasket Astragals: BHMA A156.22; T-shaped metal, surface mounted on edge of door with screws; with integral gasket and base metal as follows:
 - 1. Base Metal: Aluminum.
 - 2. Gasket Material: Silicone.

2.21 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.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - d. Dor-O-Matic; an Ingersoll-Rand company.
 - e. K2 Commercial Hardware; a Black & Decker Corp. company.
 - f. LCN Closers; an Ingersoll-Rand company.
 - g. Norton Door Controls; an ASSA ABLOY Group company.
 - h. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - i. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - j. Yale Security Inc.; an ASSA ABLOY Group company.
- B. Cast-Aluminum Surface Closers: Grade 1; Traditional Type with mechanism enclosed in cast-aluminum alloy shell.
 - 1. Mounting: Hinge side.
 - 2. Type: Regular arm.
 - 3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
- C. Surface Closer without Cover: Grade 1; Modern Type.

1. Mounting: Hinge side top jamb.
2. Type: Regular arm.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Closing Power Adjustment: At least 35 percent more than minimum tested value.

D. Surface Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.

1. Mounting: Hinge side, top jamb.
2. Type: Regular arm.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Cover Material: Aluminum.
5. Closing Power Adjustment: At least 35 percent more than minimum tested value.

2.22 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.

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - b. LCN Closers; an Ingersoll-Rand company.
 - c. Norton Door Controls; an ASSA ABLOY Group company.
 - d. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

B. Concealed-in-Door Closer: Grade 1; mortised into top rail of minimum 1-3/4-inch- (44-mm-) thick doors and track mortised into head frame; with double lever arm indicated.

1. Type: Mortised soffit plate.
2. Arm: Regular.
3. Closing Power Adjustment: At least 50 percent more than minimum tested value.

C. Concealed Overhead Closer: Grade 1; mortised into head frame; with cast-metal body and exposed cover plate.

1. Type: Concealed arm and track, butt or pivot hung, single acting.
2. Arm: Regular.
3. Track: Regular.
4. Cover Plate Material: Aluminum.
5. Backcheck: Adjustable.
6. Closing Power Adjustment: At least 50 percent more than minimum tested value.

D. Concealed Floor Closer: Grade 1; with cement case and cast-iron closer body case and top pivot; for single acting doors.

1. Type: Center pivoted; include top pivot.

2. Fire Rated: Listed for use with labeled fire-rated doors where indicated.
3. Function: Regular.
4. Backcheck: Adjustable.
5. Closing Power Adjustment: At least 50 percent more than minimum tested value.
6. Case Depth: Regular, 4 inches (100 mm).
7. Floor Plates: Provide recessed floor plates with insert of floor finish material and extended closer spindle to accommodate thickness of floor finish unless thresholds are indicated.
 - a. Material: Aluminum.

2.23 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] [loss of power].
 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - c. LCN Closers; an Ingersoll-Rand company.
 - d. Norton Door Controls; an ASSA ABLOY Group company.
 - e. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 2. Type: Single-point hold open.
 3. Mounting: Surface mounted on face of door.
 4. Options: Adjustable backcheck.

2.24 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Baldwin Hardware Corporation.
 - c. Burns Manufacturing Incorporated.
 - d. Cal-Royal Products, Inc.
 - e. Don-Jo Mfg., Inc.
 - f. Door Controls International, Inc.
 - g. Hager Companies.
 - h. Hiawatha, Inc.
 - i. IVES Hardware; an Ingersoll-Rand company.

- j. Rockwood Manufacturing Company.
- k. Stanley Commercial Hardware; Div. of The Stanley Works.
- l. Trimco.

- B. Rigid-Type Floor Stop: Grade 1; with rubber bumper; for surface-screw application.
- C. Dome-Type Floor Stop: Grade 1; with minimum 1-inch- (25-mm-) high bumper for doors without threshold and 1-3/8-inch- (35-mm-) high bumper for doors with threshold ; provide with extruded aluminum riser for carpet installations.
- D. Combination Floor Stop and Holder: Grade 1; for surface-screw application; with automatic hold open and release by pushing door.
- E. Manual Combination Floor Stop and Holder: Grade 1; 3-1/2 inches (89 mm) long, with holder, keeper, and rubber bumper; for surface-screw application.
- F. Chain Door Stops: Grade 2; welded chain, each end attached to compression springs, both covered with protective sleeve; for surface-screw application.
- G. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch (64-mm) diameter, minimum 3/4-inch (19-mm) projection from wall; with backplate for concealed fastener installation; with concave bumper configuration.
- H. Roller-Type Wall Bumpers: Grade 1; minimum 4-3/8-inch (111-mm) projection from wall; for surface-screw application.
- I. Lever-Type Door Holders: Grade 1; minimum 4-inch- (102-mm-) long arm that swings up and remains in vertical position; with replaceable rubber tip; for surface-screw application.
- J. Plunger-Type Door Holders: Grade 1; minimum 1-1/8-inch (29-mm) plunger throw; with replaceable rubber tip; for surface-screw application.

2.25 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; [wall-mounted electromagnetic single] [floor-mounted electromagnet single] [floor-mounted electromagnet double] unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.26 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8; type and grade as indicated in door hardware schedule.

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Glynn-Johnson; An Ingersoll-Rand Company.
 - c. Rockwood Manufacturing Company.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.27 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.
 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Sealeze; a unit of Jason Incorporated.
 - g. Zero International.
- B. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame rabbet with self-adhesive.
- C. Spring-Metal Perimeter Gasketing: Minimum 0.012-inch- (0.30-mm-) thick aluminum gasket material fastened to frame rabbet with nails or screws.
- D. Rigid, Housed, Perimeter Gasketing: Sponge silicone gasket material held in place by aluminum housing; fastened to frame stop with screws.
- E. Adjustable, Housed, Perimeter Gasketing: Screw-adjustable sponge silicone gasket material held in place by aluminum housing; fastened to frame stop with screws.
- F. Interlocking Perimeter Gasketing: Minimum 0.018-inch- (0.46-mm-) thick zinc gasket material consisting of two pieces, one fastened to door and one fastened to frame, that interlock when door is closed; mounted with screws.
- G. Overlapping Astragals for Meeting Stiles: Vinyl strip gasket material held in place by aluminum housing and overlapping when doors are closed; mounted to face of meeting stile with screws; surface mounted to each door.
- H. Meeting Astragals for Meeting Stiles: Silicone bulb gasket material held in place by aluminum housing; mounted with screws.
 1. Mounting: Mortised into edge of one door.

- I. Adjustable Astragals for Meeting Stiles: Screw-adjustable silicone gasket material held in place by aluminum housing; mounted with screws.
 - 1. Mounting: Mortised into edge of each door.
- J. Door Sweeps: Silicone gasket material held in place by flat aluminum housing or flange; surface mounted to face of door with screws.
- K. Door Shoes: Brush pile gasket material held in place by aluminum housing; mounted to bottom edge of door with screws.
 - 1. Extended Housing: One side of door.
 - 2. Mounting: Mortised into bottom edge of door.
- L. Automatic Door Bottoms: Sponge silicone gasket material held in place by aluminum housing that automatically drops to form seal when door is closed; mounted to bottom edge of door with screws.
 - 1. Mounting: Semimortised into bottom of door.
 - 2. Type: Low-closing-force type for doors required to meet accessibility requirements.

2.28 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - g. Sealeze; a unit of Jason Incorporated.
 - h. Zero International.
- B. Compressing-Top Thresholds: Metal member with compressible vinyl seal on top of threshold that seals against bottom of door; and base metal of aluminum.
- C. Saddle Thresholds:
 - 1. Type: Fluted top, barrier free.
 - 2. Base Metal: Aluminum.
- D. Half-Saddle Thresholds: Fluted-top metal member; and base metal of aluminum.
- E. Saddle Thresholds for Floor Closers: Fluted top.
 - 1. Type: Type B, for offset-hung doors; ends not mitered.
 - 2. Base Metal: Aluminum.

2.29 SLIDING DOOR HARDWARE

- A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Cox, Arthur, & Sons, Inc.
 - b. Hager Companies.
 - c. Henderson, PC, Inc.
 - d. Johnson, L. E., Products, Inc.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Pocket Sliding Door Hardware: Grade 1; rated for doors weighing up to 240 lb (108 kg), overhead box rails and door hardware that allows vertical adjustment.
- 1. Rail Material: Extruded aluminum.
 - 2. Door Type: Biparting.
 - 3. Rail Configuration: I-beam.
 - 4. Wheel Assembly: Two wheel or four wheel, roller bearings.
 - 5. Pulls: Flush, mortised into door.
 - 6. Accessories:
 - a. Bumper stops; wrought steel.
 - b. Floor guides installed within pocket.

2.30 FOLDING DOOR HARDWARE

- A. General: BHMA A156.14; complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Cox, Arthur, & Sons, Inc.
 - b. Hager Companies.
 - c. Henderson, PC, Inc.
 - d. Johnson, L. E., Products, Inc.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Multiple Folding Door Hardware: Rated for door panels weighing up to 50 lb (23 kg) Grade 1; with rails and door hardware that allows horizontal and vertical adjustment.
- 1. Rail Material: Extruded aluminum.
 - 2. Rail Configuration: I-beam.
 - 3. Mounting: Mounted overhead.
 - 4. Wheel Assembly: Two wheel or four wheel, with roller bearing.

2.31 FABRICATION

- A. 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.

2.32 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.

PART 3 - EXECUTION

3.1 INSTALLATION

- 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."

- C. 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."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. 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.
- F. 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).
- G. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Furnish permanent cores to Owner for installation.
- H. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- I. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- J. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- K. 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.
- L. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- M. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- N. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

- O. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.2 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.

3.3 DOOR HARDWARE SCHEDULE

Door Hardware Set 1

Locations:

Door number 101

Qty.	Item	Finish
2	Continuous Hinge.	628
2	Exit Devices (Concealed Rod).	630
2	Rim Housing.	626
2	Mortise Cylinder.	626
3	Perm. Core (Best IC 7 pin installed by Owner)	
2	Offset Pull.	630
1	Closer.	689
1	Auto Operator.	689
1	Flush Mounted Push Plate	689
1	Key Switch.	626.

Door Hardware Set 2

Locations:

Door number 102

Qty.	Item	Finish
2	Continuous Hinge.	628
2	Exit Devices (Concealed Rod).	630
2	Rim Housing.	626
2	Mortise Cylinder.	626
3	Perm. Core (Best IC 7 pin installed by Owner)	
2	Offset Pull.	630
2	Closer.	689

Door Hardware Set 3

Locations:

Door numbers 103,
111, 201 and 207

Qty.	Item	Finish
3	5BB1 4.5 x 4.5	652
1	Exit Device (Concealed Rod)	630
1	Rim Housing	626

1	Mortise Cylinder	626
3	Perm Core (Best IC 7 pin installed by Owner)	
1	Kick Plate	630
1	Trim – “Dorma” R Trim	630
3	Silencers	grey

Door Hardware Set 4

Locations:

Door Numbers 105,
106, 113, 209, and
210

Qty.	Item	Finish
3	5BB1 4.5 x 4.5	652
1	Classroom Lock	626
3	Perm Core (Best IC 7 pin installed by Owner)	
1	Kick Plate	630
1	Closer	689
1	Trim – “Dorma” R Trim	630
3	Silencers	Grey

Door Hardware Set 5

Locations:

Door Numbers 108,
110, 204 and 206

Qty.	Item	Finish
3	5BB1 4.5 x 4.5	652
1	5BB1 4.5 x 4.5	689
1	Closer	630
2	Offset Pull	630
1	Kickplate	630
3	Push plate	Grey
	Silencers	

Door Hardware Set 6

Locations:

Door Numbers 104
and 112

Qty.	Item	Finish
3	5 Knuckle Ball Bearing full Mortise Hinges	628
1	Exit Device (Concealed Rod)	630
1	Closer	689
1	Closer	626
1	Mortise Cylinder (Opened from outside with key)	630
1	Wide stile pull trim	630
1	Kick Plate	630

Door Hardware Set 7

Locations:

Door Numbers 107
and 202

Qty.	Item	Finish
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3	5BB1 4.5 x 4.5	652
1	Office lock	626
1	Kick Plate	630
1	Trim – “Dorma” R Trim	630

Door Hardware Set 8

Locations:

Door Numbers 109
and 205

Qty	Item	Finish
3 Each Leaf.	Hinge 5BB1 4.5 x 4.5	652
1	Closet lock	626
1	Kick Plate	630
1	Trim – “Dorma” R Trim	630

Door Hardware Set 9

Locations:

Door Numbers 208
and 215

Qty.	Item	Finish
3 Each Leaf.	Hinge 5BB1 4.5 x 4.5	652
2	6” Concealed Barrel Bolts	630
1	Closet Lock	626
2	Kick Plates	630
1	Trim – “Dorma” R Trim	630

Door H/dware Set 10

Locations:

Door Number 203

Qty.	Item	Finish
1	Concealed Top Hung Sliding Door Gear	
3 Each Leaf	Hinge 5BB1 4.5 x 4.5	652
1 Each Leaf	Recessed Pull	630
1 Each Leaf	6” Recessed Barrel Bolt	630
1	Sliding Door Lock (key operation one side knob other)	626
1	Trim	630

Door H/dware Set 11

Locations:

Door Numbers 211,
212 and 213

Qty.	Item	Finish
1 Set	“Norwood” 3070EX M/S	Anod. Aluminum
1	Narrow Stile Sliding Door Lock	630

END OF SECTION 087111

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Glazed entrances.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design glass, including comprehensive engineering analysis according to the current International Building Code] by a qualified professional engineer, using the following design criteria:
 - 1. Design Wind Pressures: As indicated on Drawings.
 - 2. Design Snow Loads: As indicated on Drawings.
 - 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 4. Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass to resist each of the following combinations of loads:
 - a. Outward design wind pressure minus the weight of the glass. Base design on glass type factors for short-duration load.
 - b. Inward design wind pressure plus the weight of the glass plus half of the design snow load. Base design on glass type factors for short-duration load.
 - c. Half of the inward design wind pressure plus the weight of the glass plus the design snow load. Base design on glass type factors for long-duration load.
 - 5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 - 6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.4 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.

- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Preconstruction adhesion and compatibility test report.

1.6 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- 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.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which 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.
- B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which 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 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
 1. Large-Missile Test: For all glazing, regardless of height above grade.
- D. 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. 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).
 2. 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.
 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I, complying with other requirements specified and with visible light transmission not less than 91 percent.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AFG Industries, Inc.; Krystal Klear.
 - b. Guardian Industries Corp.; Ultrawhite.
 - c. Pilkington North America; Optiwhite.
 - d. PPG Industries, Inc.; Starphire.
- C. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

- D. Pyrolytic-Coated, Self-Cleaning, 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.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. AFG Industries, Inc.; Spotless Ti.
 - b. Cardinal Glass Industries; LoE2 Plus.
 - c. Pilkington North America; Activ.
 - d. PPG Industries, Inc.; SunClean.

2.3 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. 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 cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Interlayer Color: Clear unless otherwise indicated.

2.4 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, and complying with other requirements specified.
1. Sealing System: Dual seal.
 2. Spacer: Manufacturer's standard spacer material and construction

2.5 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

2.6 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
 2. EPDM complying with ASTM C 864.
 3. Silicone complying with ASTM C 1115.
 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.7 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will 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 indicated by manufacturer's designations
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Applications: All Exterior windows and sliding doors.
- C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

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 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 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. 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.
- F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.10 MONOLITHIC-GLASS TYPES

- A. Glass Type: Clear fully tempered float glass.
 - 1. Thickness: 6.0 mm.
 - 2. Provide safety glazing labeling.

2.11 LAMINATED-GLASS TYPES

- A. Glass Type: Clear laminated glass with two plies of float glass.
 - 1. Thickness of Each Glass Ply: 3.0 mm
 - 2. Interlayer Thickness: 0.030 inch (0.76 mm).
 - 3. Provide safety glazing labeling.

2.12 INSULATING-GLASS TYPES

- A. Glass Type: Low-e-coated, clear insulating glass.
 - 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Thickness of Each Glass Lite: 3.0 mm.
 - 3. Outdoor Lite: Float glass/Ultraclear fully tempered float glass.
 - 4. Interspace Content: Argon.
 - 5. Indoor Lite: Float Glass/Ultraclear fully tempered float glass.
 - 6. Low-E Coating: Pyrolytic on second surface.
 - 7. Provide safety glazing labeling.

2.13 FIRE-PROTECTION-RATED GLAZING TYPES

- A. Glass Type: 20-minute fire-rated glazing with hose-stream test; Retain subparagraph below if required.
 - 1. Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 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. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
- H. 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.

3.2 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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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. Apply heel bead of elastomeric sealant.
- F. 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.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 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.

3.4 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.

3.5 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. 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; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 08 81 17 - FIRE-RATED GLASS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-rated glazing materials installed as vision lights in fire-rated doors.
 - 2. Fire-rated glazing materials installed as sidelites, transoms, borrowed lites in fire-rated frames.
- B. Related Sections include the following:
 - 1. Section 08 "Metal Doors and Frames" for vision panels in interior doors and interior vision panel (borrowed lites) frames.
 - 2. Section 08 "Flush Wood Doors" for vision panels in interior doors.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- C. Consumer Product Safety Commission (CPSC):
 - 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- D. Glass Association of North America (GANA):
 - 1. GANA – Glazing Manual.
 - 2. FGMA – Sealant Manual.
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 80: Fire Doors and Windows.
- F. Underwriters Laboratories, Inc. (UL):
 - 1. UL 263: Fire tests of Building Construction and Materials

1.3 PERFORMANCE REQUIREMENTS

- A. Fire-rated, clear and wireless glazing material for use in locations such as doors, sidelites, transoms, borrowed lites, and wall applications with fire rating requirements ranging from 45 minutes to 2 hours with required hose stream test; for use in interior and exterior applications.
- B. Provides protection by reducing the radiant and conductive heat transfer

1.4 SUBMITTALS

- A. Comply with requirements of Section 01 33 0 Submittals

- B. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.
- C. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.
- D. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- E. Samples: Submit, for verification purposes, approx. 8-inch by 10-inch sample for each type of glass indicated.

1.5 QUALITY ASSURANCE

- A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.
- B. Fire Resistance Rated Glass: Each lite shall bear permanent, nonremovable label of UL certifying it for use in tested and rated fire resistive assemblies.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials under provisions of Section 01 60 00<Insert Section #>.
- B. Deliver materials to specified destination in manufacturer or distributor's packaging, undamaged, complete with installation instructions.
- C. Pilkington Pyrostop® must not be exposed outside the range -40 degrees F to 120 degrees F (-40 degree C to +50 degrees C) during storage and transportation.
- D. Store off ground, under cover, protected from weather and construction activities.
- E. Do not expose the non-PVB side of glass to UV light.
- F. Store sheets of glass vertically. DO NOT lean.

1.7 WARRANTY

- A. Provide manufacturer's limited warranty under provision of section 01 78 00<Insert Section #>.

PART 2 - PRODUCTS

2.1 FIRE-RATED GLAZING MATERIALS

- A. Basis of Design: Manufacturer: Pilkington Pyrostop® as manufactured by the Pilkington Group and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065,

voice (800.426.0279) fax (425.396.8300), e-mail sales@fireglass.com, Web site
www.fireglass.com.

- B. Composition: Composed of multiple sheets of "Optiwhite" high visible light transmission glass laminated with an intumescent interlayer.
- C. Properties:
 - 1. Thickness: For Interior Use: 1-7/16"
 - 2. Weight: Varies with thickness (approximate range 9 to 22 lbs./sq. ft.).
 - 3. Approximate Visible Transmission: Varies with thickness (approximate range 88 to 75 percent).
 - 4. Fire-rating: Up to 2 hours.
 - 5. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - 6. STC Rating: Up to 46 dB.
- D. Fire Rating – 60 Minutes and Greater: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E 119 and UL 263.
- E. Substitutions: No substitutions allowed.

2.2 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

- A. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air and vapor seal.
- B. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:
 - 1. Dow Corning 795 - Dow Corning Corp.
 - 2. Silglaze-II 2800 - General Electric Co.
 - 3. Spectrem 2 - Tremco Inc.
- C. Setting Blocks: Hardwood or calcium silicate; glass width by 4 inches by 3/16 inch thick.
- D. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
- E. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.3 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Observable edge damage or face imperfections.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 INSTALLATION (GLAZING)

- A. Comply with referenced GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.
- B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- C. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- D. Place setting blocks located at quarter points of glass with edge block no more than 6-inches from corners.
- E. Glaze vertically into labeled fire-rated metal frames or partition walls with the same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- F. Place glazing tape on free perimeter of glazing in same manner described above.
- G. Do not remove protective edge tape.
- H. Install removable stop and secure without displacement of tape.
- I. Do not pressure glaze.
- J. Glaze exterior openings with PVB layer toward the exterior of the building.
- K. Knife trim protruding tape.
- L. Apply cap bead of silicone sealant along void between the stop and the glazing, to uniform line, with bevel to form watershed away from glass. Tool or wipe sealant surface smooth.
- M. Provide minimum 3/16 inch edge clearance.
- N. Install in vision panels in fire-rated doors to requirements of NFPA 80.
- O. Install so that appropriate UL and Pilkington Pyrostop® markings remain permanently visible.

3.3 PROTECTION AND CLEANING

- A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.
- B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

NOTE: SEE GLAZING SCHEDULE ON FOLLOWING PAGE

3.4 GLAZING SCHEDULE

A. Interior Use:

Fire Rating	Manufacturer Designation	Supply Form	Thickness	Weight Approx.	U-Value	Daylight Trans. Approx. (%)	STC Rating Approx. (dB)	Assembly	Max. Exposed Area (Sq. In.)	Max. Width Of Exposed Glazing (In.)	or Max. Height Of Exposed Glazing (In.)
45 min.	45-200	Single Glazing	3/4" (19 mm)	9.22 lb / ft ² (45.00 kg / m ²)	.86	86	40	Other than doors Door	4,500 3,724	95-1/4 41-5/8	95-1/4 89-3/4
60 min.	60-101	Single Glazing	7/8" (23 mm)	10.86 lb / ft ² (53.00 kg / m ²)	.83	87	41	Other than doors Door	5,616 3,724	96 41-5/8	96 89-3/4
60 min.	60-201	Single Glazing	1-1/16" (27 mm)	12.90 lb / ft ² (63.00 kg / m ²)	.83	86	44	Other than doors Door	7,442 3,724	96 41-5/8	118-1/4 89-3/4
90 min.	90-102	Single Glazing	1-7/16" (37 mm)	17.61 lb / ft ² (86.00 kg / m ²)	.74	84	45	Other than doors Door	3,724 3,724	96 41-5/8	96 89-3/4
2 hr.	120-104	I.G. Units	2-1/8" (54 mm) [with 8 mm spacer, or 2-3/8" (60 mm) with 14 mm spacer]	21.71 lb / ft ² (106.00 kg / m ²)	.44	75	46	Other than doors	3,730	111	111
2 hr.	120-106	I.G. Units	2-1/4" (57 mm)	22.94 lb / ft ² (112.00 kg / m ²)	.42	75	46	Other than doors	3,730	111	111
2 hr.	120-401	I.G. Units	2-13/16" (72 mm)	30.72 lb / ft ² (150.00 kg / m ²)	.46	73	45	Fireframes ClearFloor® System	2,372	47-1/4	50-3/8

END OF SECTION

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Annealed monolithic glass mirrors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.
- C. Samples:
 - 1. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
 - 2. Mirror Clips: Full size.
 - 3. Mirror Trim: 12 inches (300 mm) long.

1.3 INFORMATIONAL SUBMITTALS

- A. Preconstruction test reports.
- B. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Glazing Publications: Comply with GANA's "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- B. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining

and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Glass Mirrors, General: ASTM C 1503.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Arch Aluminum & Glass Co., Inc.
- b. Avalon Glass and Mirror Company.
- c. Binswanger Mirror; a division of Vitro America, Inc.
- d. D & W Incorporated
- e. Donisi Mirror Company.
- f. Gardner Glass, Inc.
- g. Gilded Mirrors, Inc.
- h. Guardian Industries.
- i. Head West.
- j. Independent Mirror Industries, Inc.
- k. Lenoir Mirror Company.
- l. Maran-Wurzell Glass & Mirror.
- m. National Glass Industries.
- n. Stroupe Mirror Co., Inc.
- o. Sunshine Mirror; Westshore Glass Corp.
- p. Virginia Mirror Company, Inc.
- q. Walker Glass Co., Ltd.

B. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.

1. Nominal Thickness: 6.0 mm.

2.2 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Approved by mirror manufacturer.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors.
 1. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

- A. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.
 1. Finish: Clear bright anodized.
- B. Mirror Bottom Clips: As indicated.
- C. Mirror Top Clips: As indicated.
- D. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- E. Anchors and Inserts: Provide devices as required for mirror hardware installation.

2.4 FABRICATION

- A. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- B. Mirror Edge Treatment: Rounded polished. Seal edges of mirrors with edge sealer.
- C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 2. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.
- B. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

- C. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- D. Wall-Mounted Mirrors: Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
- E. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- F. Do not permit edges of mirrors to be exposed to standing water.
- G. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- H. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fixed, **extruded-aluminum** louvers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
- C. Samples: For each type of metal finish required.
- D. Delegated-Design Submittal: For louvers indicated to comply with structural[**and seismic**] performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on tests performed according to AMCA 500-L.
- B. Windborne-debris-impact-resistance test reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural **and seismic** performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
 - 2. Wind Loads: Determine loads based on a uniform pressure of **30 lbf/sq. ft. (1436 Pa)**, acting inward or outward.

- C. Windborne-Debris-Impact Resistance: Louvers located within 30 feet (9.1 m) of grade shall pass **[basic] [enhanced]**-protection, large-missile testing requirements in ASTM E 1996 for **[Wind Zone 1] [Wind Zone 2] [Wind Zone 3] [Wind Zone 4]** when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.
- D. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to **[ASCE/SEI 7] <Insert requirement>**.
 - 1. Design earthquake spectral response acceleration, short period (Sds) for Project is .302.
 - 2. Component Importance Factor: **1.25/**
- E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

2.2 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Drainable-Blade Louver :
 - 1. **Basis-of-Design Product:** Subject to compliance with requirements, provide **product indicated on Drawings** or comparable product by one of the following:
 - a. Air Balance Inc.; a Mestek company.
 - b. Air Flow Company, Inc.
 - c. Airolite Company, LLC (The).
 - d. All-Lite Architectural Products.
 - e. American Warming and Ventilating; a Mestek company.
 - f. Architectural Louvers; Harray, LLC.
 - g. Arrow United Industries; a division of Mestek, Inc.
 - h. Carnes Company, Inc.
 - i. Cesco Products; a division of Mestek, Inc.
 - j. Construction Specialties, Inc.
 - k. Dowco Products Group; Safe Air of Illinois.
 - l. Greenheck Fan Corporation.
 - m. Industrial Louvers, Inc.
 - n. Louvers & Dampers; a division of Mestek, Inc.
 - o. Metal Form Manufacturing, Inc.
 - p. NCA Manufacturing, Inc.
 - q. Nystrom, Inc.
 - r. Pottorff.
 - s. Reliable Products, Inc.
 - t. Ruskin Company; Tomkins PLC.
 - u. United Enertech.
 - v. Vent Products Co., Inc.
 - 2. Louver Depth: **6 inches (150 mm).**
 - 3. Frame and Blade Nominal Thickness: Not less than **0.080 inch (2.03 mm) for blades and 0.080 inch (2.03 mm) for frames.**
 - 4. Mullion Type: Exposed.
 - 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.3 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Galvanized-Steel Sheet: ASTM A 653/A 653M, **[G60 (Z180)] [G90 (Z275)]** zinc coating, mill phosphatized.
- D. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use **tamper-resistant** screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 - 3. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
 - 4. For fastening stainless steel, use 300 series stainless-steel fasteners.
 - 5. For color-finished louvers, use fasteners with heads that match color of louvers.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION

- A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Join frame members to each other and to fixed louver blades with fillet welds **concealed from view, as standard with louver manufacturer** unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with **[AAMA 2604] [AAMA 2605]** and containing not less than **[50] [70]** percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: **As selected by Architect from manufacturer's full range.**

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

- D. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

3.2 ADJUSTING

- A. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION 089119

SECTION 09221 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).

1.2 SUBMITTAL

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

1.3 QUALITY ASSURANCE

- 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. Sound Transmission Characteristics: For STC-rated assemblies that incorporate non-load-bearing steel framing, 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.

1.4 SYSTEM REQUIREMENTS

- A. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
 - 1. Gypsum board partitions:
 - a. Standard systems: Maximum deflection of $l/240$ of partition height.
 - b. Systems to receive water resistant gypsum board or backer board: Maximum deflection of $l/360$ of partition height.
 - 2. Interior suspended ceilings and soffits: Maximum deflection of $l/360$ of distance between supports.
 - 3. Nonstructural components that are permanently attached to structures and their support attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance to local jurisdiction.
- B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.
- C. Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. 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), hot-dip galvanized zinc coating, unless otherwise indicated.

2.2 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0179 inch (0.45 mm).
- B. Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-(50.8-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.
 - 2. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Steel Network Inc. (The); VertiClip SLD VertiTrack VTD Series.
 - 2) Superior Metal Trim; Superior Flex Track System (SFT).
- C. Firestop Track: As specified in Division 07 Section "Fire-Resistive Joint Systems."
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Minimum Base-Metal Thickness: 0.0179 inch(0.45 mm) .
- E. Cold-Rolled Channel Bridging: 0.0538-inch(1.37-mm) bare-steel thickness, with minimum 1/2-inch-(12.7-mm-) wide flanges.
 - 1. Depth: 1-1/2 inches(38.1 mm).
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches(38.1 by 38.1 mm), 0.068-inch-(1.73-mm-) thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base Metal Thickness: 0.0179 inch(0.45 mm) .
 - 2. Depth: 7/8 inch(22.2 mm).
- G. Resilient Furring Channels: 1/2-inch-(12.7-mm-) deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped.

2.3 CEILING AND SOFFIT SUPPORT MATERIALS

- A. Hanger Anchorage Devices: Screws, clips, bolts or other devices compatible with indicated structural anchorage for ceiling hangers and whose suitability has been proven through standard construction practices or by certified test data.
- B. Powder-Actuated Fasteners in Concrete: Fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers [and with capability to sustain, without failure, a load equal to 10x calculated loads].
- C. Hangers:
 - 1. Steel wire or rods, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
 - 2. Wire: ASTM A 641, soft, Class 1 galvanized.
 - 3. Rods and flats:
 - 1. Mild steel components.
 - 2. Finish: Galvanized or painted with rust-inhibitive paint for interior work; galvanized for exterior work.
- D. Framing System:
 - 1. Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635, with exposed surfaces finished in manufacturer's standard enamel paint finish.
 - 2. Fire rating: 1 [1-1/2] [2] [3] hour rating in accordance with UL assembly indicated.
 - 3. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
 - 4. Accessories:
 - a. U-shaped channel molding.
 - b. Galvanized carbon steel (12 ga.) hanger wire.
 - 5. Acceptable product: Equivalent to Drywall Suspension System by USG.

2.4 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 2. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 - 3. 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.
- C. Backer Plates:
 - 1. Steel, galvanized; 6 inches wide x 20 [16] gauge minimum x lengths to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.
 - 2. Elimination of backer plates or direct attachment of accessories or equipment to studs will not be allowed.
- D. Hanger Wire Sound Isolators: Provide where indicated for sound-rated suspended ceilings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, heavy trim, grab bars, toilet accessories, furnishings or similar construction.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. 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 penetrating 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(12.7-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.
- C. 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.
- D. 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.

END OF SECTION 09221

SECTION 092900 - 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 and exterior gypsum board.
- B. Related Requirements:
 - 1. Section 092216 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

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.

1.4 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 25 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Wall and Ceiling gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting of 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 recommendations, 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, those that are moisture damaged, and those that are 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. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. Lafarge North America Inc.
 - 5. National Gypsum Company.
 - 6. PABCO Gypsum.
 - 7. Temple-Inland.
 - 8. USG Corporation.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch
2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch
2. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
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.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

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 drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound to produce Level 5 finish.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of [50] <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- 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.
 - 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert number> percent.
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- F. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates with Installer present, for compliance with requirements and other conditions affecting performance.
- 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, except floors. 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. 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.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: Vertical surfaces unless otherwise indicated.
 - 2. Ceiling Type: Ceiling surfaces.
- 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 horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On 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.
2. 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 recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
 5. U-Bead: Use at exposed panel edges.
 6. Curved-Edge Cornerbead: Use at curved openings.

3.5 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 5: At panel surfaces exposed to view.
 - a. Primer and its application to surfaces are specified in other Section 099123 "Interior Painting."

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Stone thresholds.
 - 3. Waterproof membrane.
 - 4. Crack isolation membrane.
 - 5. Tile backing panels.
 - 6. Metal edge strips.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
 - 1. Each type and composition of tile and for each color and finish required.
 - 2. Assembled samples, with grouted joints, for each type and composition of tile and for each color and finish required.
 - 3. Stone thresholds in 6-inch (150-mm) lengths.

1.3 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 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 on drawings.

1.4 QUALITY ASSURANCE

- A. 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 each type of floor tile installation.
 - 2. Build mockup of each type of wall tile installation.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. Tile Type CWT-1: Glazed wall tile
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide tile indicated on drawing or approved equal.
 - 2. Module Size: 12 x 24 inches.
 - 3. Thickness: 5/16 inch (8 mm).
 - 4. Face: Pattern of design indicated, with manufacturer's standard edges.
 - 5. Finish: Matte.
 - 6. Tile Color and Pattern: Match Architect's sample.
 - 7. Grout Color: As selected by Architect from manufacturer's full range.
 - 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Wainscot Cap: Bullnose cap 2 by 8 inches.
 - b. External Corners for Thin-Set Mortar Installations: same size as adjoining flat tile.
 - c. Internal Corners: Field-buttet square corners
- C. Tile Type CWT-2, CWT – 3 and CWT - 4: Glazed wall tile
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide: Daltile-to match existing or approved equal.
 - 2. Module Size: 4 x 4 inches.
 - 3. Thickness: 5/16 inch (8 mm).
 - 4. Face: to match existing.
 - 5. Finish: to match existing.
 - 6. Tile Color and Pattern: Match existing.
 - 7. Grout Color: As selected by Architect from manufacturer's full range.
 - 8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: Coved, module size 4-by 36 inches .
 - b. External Corners for Thin-Set Mortar Installations: same size as adjoining flat tile.
 - c. Internal Corners: Field-buttet square corners

2.2 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. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
 - 1. Description: Match Architect's sample.

2.3 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. C-Cure; C-Cure Board 990.
 - b. Custom Building Products; Wonderboard.
 - c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - d. USG Corporation; DUROCK Cement Board.
 - e. Or approved equal
 - 2. Thickness: 5/8 inch (15.9 mm)
- B. Fiber-Cement Underlayment: ASTM C 1288.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corp.; FiberCement Underlayment.
 - b. James Hardie; Hardiebacker.
 - c. Or approved equal
 - 2. Thickness: 1/4 inch (6.4 mm).

2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated.
- B. Chlorinated-Polyethylene-Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Noble Company (The); Nobleseal TS.
 - b. Or approved equal

2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated.
- B. Chlorinated-Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Noble Company (The); Nobleseal CIS.
 - b. Mapei Corporation - Mapelastic
 - c. ParexUSA – Fracture Guard
 - d. Or approved equal

2.6 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Boiardi Products; a QEP company.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Southern Grouts & Mortars, Inc.
 - j. Summitville Tiles, Inc.
 - k. TEC; a subsidiary of H. B. Fuller Company.
 - l. Or approved equal
2. For wall applications, provide nonsagging mortar.

2.7 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Boiardi Products; a QEP company.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Southern Grouts & Mortars, Inc.

- j. Summitville Tiles, Inc.
- k. TEC; a subsidiary of H. B. Fuller Company.
- l. Or approved equal

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, stainless steel, ASTM A 666, 300 Series exposed-edge material.
- C. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bonsal American, an Oldcastle company; Grout Sealer.
 - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
 - c. C-Cure; Penetrating Sealer 978.
 - d. Custom Building Products; Grout and Tile Sealer.
 - e. Jamo Inc.; Matte Finish Sealer.
 - f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
 - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - i. TEC, a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.
 - j. Or approved equal

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 installed tile.
 - 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.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set 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, use factory blended tile or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA 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 TCA 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. Tile floors in wet areas.
- 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. 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.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
 - 2. Quarry Tile: 1/4 inch (6.35 mm).
 - 3. Paver Tile: 1/4 inch (6.35 mm).
 - 4. Glazed Wall Tile: 1/16 inch (1.6 mm).
 - 5. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).
- G. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
- H. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile 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.

- I. Grout Sealer: Apply grout sealer to grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- J. Install cementitious backer units and fiber-cement underlayment and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. duce waterproof membrane of uniform thickness and bonded securely to substrate.
- K. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

3.4 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

- 1. Tile Installation F113: Thin-set mortar; TCA F113.
 - a. Tile Type: 2" x 2" Floor Tile^.
 - b. Thin-Set Mortar: Dry-set portland cement mortar.
 - c. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Metal Studs or Furring:

- 1. Tile Installation W244: Thin-set mortar on cementitious backer units or fiber cement underlayment; TCA W244.
 - a. Tile Type: 2" x 2" Ceramic wall Tile.
 - b. Thin-Set Mortar: Dry-set portland cement mortar.
 - c. Grout: Standard unsanded cement.

END OF SECTION 093000

SECTION 095123 - ACOUSTICAL TILE 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:
 - 1. Acoustical tiles for ceilings.
 - 2. Concealed suspension systems.
- B. Related Requirements:
 - 1. 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] <Insert location>.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6-inches- (150-mm-) in size.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).

- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency].
- D. Evaluation Reports: For each acoustical tile 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 Units: Full-size tiles equal to 2 percent of quantity installed.
 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (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 tiles, 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 tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile 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 tile 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 for Class A materials.
 - 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 ACOUSTICAL TILES, GENERAL

- A. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system from single source from single manufacturer.
- B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
 - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

- C. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL TILES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or approved equal product by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Classification: Provide tiles complying with ASTM E 1264 for type, form, and pattern as follows:
- C. Color: White.
- D. LR: Not less than 0.80.
- E. NRC: Not less than 0.55.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: FLB manufacturer's special proprietary edge detail
- H. Thickness: 5/8 inch (15 mm).
- I. Modular Size: 24 by 24 inches .
- J. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- 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.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch (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 Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.
- G. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical tiles in-place.

2.5 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or approved equal product by one of the following:
1. Armstrong World Industries, Inc.
 2. USG Interiors, Inc.; Subsidiary of USG Corporation..
- B. Direct-Hung, Double-Web, Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z90) coating designation.
1. Structural Classification: Heavy-duty system.
 2. Access: Upward and end pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.
 - a. Initial Access Opening: In each module, 24 by 24 inches (610 by 610 mm).

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or approved equal product by one of the following:
1. Armstrong World Industries, Inc.
 2. CertainTeed Corp.
 3. Chicago Metallic Corporation.
 4. Fry Reglet Corporation.
 5. Gordon, Inc.
 6. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying 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 tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- C. 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 and 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. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following::
- a. Acoustical Sealant for Exposed and Concealed Joints:
 - b. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - c. USG Corporation; SHEETROCK Acoustical Sealant.
 - d. Or approved equal
- B. 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.

2.8 MISCELLANEOUS MATERIALS

- A. Acoustical Tile Adhesive: Type recommended by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.
- B. Staples: 5/16-inch- (8-mm-) long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- 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, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches (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 postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.
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. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.
 2. Install tiles with pattern running in one direction parallel to [long] [short] axis of space.
 3. Install tiles in a basket-weave pattern.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.
1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
 2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches (305 mm) o.c.
 3. 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 tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.
 - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled 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 postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 - 2. 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 tile 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 tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE – B1

- A. Resilient Base:
 - 1. Manufacturers: Subject to compliance with requirements, provide: Roppe refer to finish schedule for color and location. Or approved equal
- B. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Straight (flat or toeless).
- C. Minimum Thickness: 0.5 inch .
- D. Height: 4 inches (102 mm).
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed
- G. Inside Corners: Preformed].
- H. Finish: As selected by Architect from manufacturer's full range.
- I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)[, except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less].
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

4. Moisture Testing: Perform tests recommended by manufacturer[and as follows]. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of [3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)] <Insert emission> in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum [75 percent] <Insert acceptable percentage> relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply two coats.
- E. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interlocking, rubber floor tile.
 - 2. Rubber floor tile.
 - 3. Rubber sheet flooring.
 - 4. Sheet vinyl flooring.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details and locations of the following:
 - 1. Border tiles.
 - 2. Floor patterns.
 - 3. Layout, colors, widths, and dimensions of game lines and markers.
 - 4. Locations of floor inserts for athletic equipment installed through flooring.
 - 5. Seam locations for sheet flooring.
- C. Samples: For each type of flooring indicated.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 FIELD CONDITIONS

- A. Adhesively Applied Products:
 - 1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 2. After post-installation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
 - 3. Close spaces to traffic during flooring installation.
 - 4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. FloorScore Compliance: Resilient athletic flooring shall comply with requirements of FloorScore Standard.
- B. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 RUBBER SHEET FLOORING

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Aacer Flooring, LLC.
 - 2. Action Floor Systems, LLC.
 - 3. Amarco Products.
 - 4. American Floor Products Company, Inc.
 - 5. ECORE International.
 - 6. Flexco.
 - 7. Horner Flooring Company, Inc.
 - 8. Johnsonite; a Tarkett company.
 - 9. Mondo America Inc.
 - 10. nora systems, Inc.
 - 11. Robbins Sports Surfaces.
 - 12. Roppe Corporation.
 - 13. Sport Court; Subsidiary of Connor Sport Court International.
 - 14. Surface America Incorporated.
- B. Description: Rubber athletic flooring provided as rolled goods for adhered installation.
- C. Material: Recycled-rubber compound.
- D. Traffic-Surface Texture: Smooth.
- E. Roll Size: Not less than 48 inches (1219 mm) wide by longest length that is practical to minimize splicing during installation.
- F. Thickness: 3/8 inch (9.5 mm).
- G. Color and Pattern: As selected by Architect from manufacturer's full range.
- H. Border: Interlocking, beveled-edge tiles, of same material as floor tile.
 - 1. Border Color and Pattern: Matching floor tile.

2.3 ACCESSORIES

- A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.

- B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.
 - 1. Adhesives shall have a VOC content of [50] [60] <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Game-Line and Marker Paint: Complete system including primer, if any, compatible with flooring and recommended in writing by flooring and paint manufacturers for use indicated.
 - 1. VOC content: Not more than 150 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Paint shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of flooring.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
 - 3. Moisture Testing:
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - 1) Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.

1. Do not install flooring until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FLOORING INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions.
- B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
- C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

3.3 SHEET FLOORING INSTALLATION

- A. Unroll sheet flooring and allow it to stabilize before cutting and fitting.
- B. Lay out sheet flooring as follows:
 1. Maintain uniformity of flooring direction.
 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (150 mm) away from parallel joints in flooring substrates.
 3. Match edges of flooring for color shading at seams.
 4. Locate seams per approved Shop Drawings.
- C. Adhered Flooring: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions.
- D. Vinyl Sheet Flooring Seams: Prepare and finish seams to produce surfaces flush with adjoining flooring surfaces.
 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless flooring.
 2. Chemically Bonded Seams: Comply with ASTM F 693. Seal seams to prevent openings from forming between cut edges and to prevent penetration of dirt, liquids, and other substances into seams.

3.4 GAME LINES AND MARKERS

- A. Mask flooring at game lines and markers, and apply paint to produce sharp edges. Where crossing, break minor game line at intersection; do not overlap lines.

- B. Lay out game lines and markers to comply with rules and diagrams published by [National Collegiate Athletic Association (NCAA)] [National Federation of State High School Associations] <Insert organization> for athletic activities indicated.

3.5 CLEANING AND PROTECTING

- A. Perform the following operations immediately after completing flooring installation:
 - 1. Remove adhesive and other blemishes from flooring surfaces.
 - 2. Sweep and vacuum flooring thoroughly.
 - 3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.
- B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 096566

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Decorative resinous flooring systems.
 - 2. Industrial resinous flooring systems.
 - 3. High-performance resinous flooring systems.

- B. Related Sections:

- 1. Section 079200 "Joint Sealants" for sealants installed at joints in resinous flooring systems.
 - 2. Section 096623 "Resinous Matrix Terrazzo Flooring" for thin-set, resinous matrix terrazzo.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: For each type of exposed finish required.
- C. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- D. Product Schedule: For resinous flooring. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
 - a. Include 48-inch (1200-mm) length of integral cove base with inside[and outside] corner.
 - 2. Simulate finished lighting conditions for Architect's review of mockups.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide: Sherwin Williams-Resuflor Deco 4 Quartz BC23. Or approved equal.

2.2 COLORS AND PATTERNS

Colors and Patterns: EP-1 Mountain Sage / EP-2 Garden Path

2.3 MATERIALS

- A. VOC Content of Liquid-Applied Flooring Components: Not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
- B. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 INDUSTRIAL RESINOUS FLOORING – F2

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, industrial-aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor[and integral cove base].
- B. System Characteristics:
 - 1. Color and Pattern: As selected by Architect from manufacturer's full range.
 - 2. Wearing Surface: Textured for slip resistance.
 - 3. Overall System Thickness: 3/16 inch (4.8 mm).
- C. Body Coats:
 - 1. Resin: Epoxy.
 - 2. Formulation Description: 100 percent solids
 - 3. Application Method: Self-leveling slurry with broadcast aggregates.
 - a. Thickness of Coats: 1/16 inch (1.6 mm)
 - b. Number of Coats: Three.
 - 4. Aggregates: Manufacturer's standard.
- D. Topcoat: Sealing or finish coats.
 - 1. Resin: Epoxy.
 - 2. Formulation Description: 100 percent solids.
 - 3. Type: Clear.
 - 4. Finish: Matte.
 - 5. Number of Coats: One.

- E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
1. Compressive Strength: 6,000 PSI per ASTM C 579.
 2. Tensile Strength: 1,500 PSI per ASTM C 307.
 3. Flexural Modulus of Elasticity: 3,400 PSI per ASTM C 580.
 4. Water Absorption: 1% (max) per ASTM C 413.
 5. Coefficient of Thermal Expansion: 40×10^{-6} in/in deg F per ASTM C 531.
 6. Indentation: 7% percent maximum per MIL-D-3134.
 7. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation per MIL-D-3134.
 8. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134.
 9. Abrasion Resistance: 0.05 grams maximum weight loss per ASTM D 1044.
 10. Flammability: Self-extinguishing per ASTM D 635.
 11. Critical Radiant Flux: 0.45 W/sq. cm or greater per NFPA 253.
 12. Hardness: 83-90, Shore D per ASTM D 2240.
 13. Bond Strength: 175 PSI, 100 percent concrete failure per ACI 503R.

2.5 ACCESSORIES

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated.
1. Formulation Description: 100 percent solids.
- B. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated.
1. Formulation Description: 100 percent solids.
- C. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.
1. Formulation Description: 100 percent solids.
 - a. Provide fiberglass scrim embedded in reinforcing membrane.
- D. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab area in 24 hours.
 - b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
 - c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum [75] <Insert number> percent relative humidity level measurement.
 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

- C. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.
 - 1. Apply waterproofing membrane to integral cove base substrates.
- D. Apply reinforcing membrane to [substrate cracks] [entire substrate surface].
- E. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
 - 1. Integral Cove Base: 4 inches (100 mm) high.
- F. Apply self-leveling slurry body coats in thickness indicated for flooring system.
 - 1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- G. Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, remove trowel marks and roughness using method recommended by manufacturer.
- H. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.
- I. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.
- B. Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.4 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 09912 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Hollow metal doors and frames.
 - 3. Plaster and Gypsum board.
 - 4. Wood trim.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
- E. 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 Project Color and Product Information" 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, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.4 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams or comparable product by one of the following:
 1. Benjamin Moore & Co.
 2. Finnaren & Haley, Inc.
 3. ICI Paints.
 4. PPG Architectural Finishes, Inc.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. Colors: As indicated in a color schedule.

2.3 BLOCK FILLERS

- A. Interior/Exterior Latex Block Filler (for unpainted block): MPI #4.
 - 1. S-W: Loxon Block Surfacers, A24W200 (for new or unpainted block only)

2.4 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: (for existing painted block or other walls in sound condition) MPI #17.
 - 1. S-W Adhesion Primer, B51W8050.
- B. Interior Latex Primer/Sealer: (For unpainted interior gypsum drywall, plaster or wood)
 - 1. S-W Premium Wall & Wood Primer, B28W-08111

2.5 METAL PRIMERS (for Door Frame)

- A. Rust-Inhibitive Primer (Water Based primer for interior/exterior metal doors/frames): MPI #107.
 - 1. S-W: Pro Industrial Pro Cryl WB Universal Primer, B66-310
- B. Waterborne Galvanized-Metal Primer (Interior or exterior): MPI #134.
 - 1. S-W: If required, Letter A Primer above can be selected
- C. Interior Epoxy Primer/Sealer: (For concrete slab – floor)
 - 1. GP 3477 Epoxy Water Emulsion Primer/Sealer

2.6 LATEX/ACRYLIC PAINTS

- A. Interior Acrylic Latex (Eggshell finish for interior walls): MPI # 52 / 52X
 - 1. S-W Promar 200 Zero VOC Interior Latex Eg-Shel, B20-2600
- B. Interior/Exterior Acrylic Latex (Semigloss finish interior & exterior metal doors/frames): MPI # 153
 - 1. S-W DTM Acrylic Coating, B66 Series (semi-gloss)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.

- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 - 1. Roughen/Abrade concrete in areas where sealing.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Contractor will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Block Substrates:

1. Acrylic WB Acrylic Eg-shel Finish low odor/low VOC System:

- a. Prime Coat: S-W Loxon Block Surfacers, A24 (unpainted CMU block wall only)
- b. Intermediate: S-W Promar 200 Zero VOC Interior Latex Eg-shel, B20-2600
- c. Topcoat: 2 coats of S-W Pro Industrial Pre-Catalyzed WB Epoxy, K45 or K46 (select sheen).

C. Gypsum Board Substrates:

- a. Prime Coat: S-W Promar 200 Zero VOC Interior Latex Primer, B28-2600 (New/Unpainted GWB)
- b. Intermediate: S-W Promar 200 Zero VOC Interior Latex Eg-shel, B20-2600
- c. Topcoat: 2 coats of S-W Pro Industrial Pre-Catalyzed WB Epoxy, K45 or K46

B. Existing Metal Lintels:

- a. Prime Coat: S-W DTM Primer-Finish, BV66W1 (for unpainted steel or galvanized steel).
- b. Topcoat: Finish with 2 coats of Pro Industrial Acrylic, B66-660, 650 or 600 (select sheen).

C. Wood:

- a. Prime Coat: S-W Premium Wall & Wood Primer, B28 (for unpainted/new wood).
- b. Topcoat: Finish with 2 coats of Pro Industrial Acrylic, B66-660, 650 or 600 (select sheen).

D. Metal Deck and Ductwork:

- a. Prime Coat: S-W Pro Industrial Pro Cryl WB Universal Primer, B66-310
- b. Finish: 1-2 Coats Pro Industrial Waterborne Acrylic Dryfall

E. Metal Frame:

- a. Prime Coat: S-W Pro Industrial Pro Cryl WB Universal Primer, B66-310
- b. Intermediate: S-W DTM Acrylic Coating, B66 Series
- c. Topcoat: S-W DTM Acrylic Coating, B66 Series

END OF SECTION 09912

SECTION 102800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.
- B. Related Sections include the following:
 - 1. Division 10 Section "Toilet Compartments" for compartments and screens.
 - 2. Division 15 Section "Plumbing" for under lavatory guards.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- B. Samples: For each accessory item to verify design, operation, and finish requirements.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.
- E. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.

1. Products of other manufacturers with equal characteristics, as judged solely by Architect, may be provided.
2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.
 1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:
 1. Toilet and Bath Accessories:
 - a. A & J Washroom Accessories, Inc.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - ~~d-e.~~ Dyson
- B. Products: Subject to compliance with requirements, provide products indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.
- C. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

- A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- C. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
 - 1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- E. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
 - 1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- F. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.
- C. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE

- A. Accessory No. 1: Jumbo roll toilet paper dispenser: Bobrick B-2892.
- B. Accessory No. 2: Channel frame mirror 18" x 36": Bobrick B-165-1836.
- ~~C. Accessory No. 3: Channel frame mirror: 36" x 36" Bobrick B-1656-3636~~
- ~~D. Accessory No. 3A: Channel frame mirror: 60" x 36" Bobrick B-1656-6036~~
- ~~E.C.~~ Accessory No. 43: ~~Surface Automatic Wall-mounted Mounted~~ Foam ~~foam~~ soap dispenser: Bobrick B-~~2013~~2013.
- ~~F.D.~~ Accessory No. 54: 42 inch long grab bar: Bobrick B-6806.99 x 42.
- ~~G.E.~~ Accessory No. 65: 36 inch long grab bar: Bobrick B-6806.99 x 36.
- ~~H.F.~~ Accessory No. 76: 18 inch long grab bar: Bobrick B-6806.99 x 18.
- ~~I. Accessory No. 8: Semi-Recessed Napkin/Tampon Vendor: Bobrick B3706C (free coin operation)~~
- ~~J. Accessory No. 9: Folding Charting Station / Shelf: Bobrick B7816~~
- ~~K.G.~~ Accessory No. 497: Electric Hand Dryer: Dyson Airblade V – AB12 Sprayed Nickel – Low Voltage, ~~Xlerator Hand Dryer Model XL-SB with Xlerator Recess Kit #40502~~
- ~~L.H.~~ Accessory No. 844: ~~Surface Mounted~~ Surface Mounted Sanitary ~~napkin~~ Napkin Disposal: Bobrick B-~~254~~270.
- ~~M. Accessory No. 11A: Partition Mounted sanitary napkin Disposal: Bobrick B-354.~~

~~N.I.~~ Accessory No. ~~942~~: Hat and coat hook: Bobrick B-682.

~~O.J.~~ Accessory No. ~~4310~~: 36 inch long grab bar: Bobrick 832x36.

~~K.~~ Accessory No. ~~4411~~: Folding Shower/Dressing Area Seat: Bobrick B5192.

~~L.~~ Accessory No. ~~12~~: SS Shower Curtain Rod & Vinyl Shower Curtain: Bobrick B207/B204.

~~P.M.~~ Accessory No. ~~13~~: Grab Bar/Hand Shower: (See Plumbing drawings).

~~Q.N.~~ Accessory No. 14: Toilet & Shower Partitions (See specification section 102113).

~~R.O.~~ Accessory No. 15 Urinal Screen (See specification section 102113).

~~S.P.~~ Accessory No. 16 Channel Frame Mirror 24x36: Bobrick B13165-2436.

~~T.Q.~~ Accessory No. 17 Sanitary Napkin Dispenser: Bobrick B3706.

~~U.R.~~ Accessory No. 18 See Plumbing drawings.

~~V.S.~~ Accessory No. 19 See Plumbing drawings.

~~W.T.~~ Accessory No. 20 Full Length Channel Frame Mirror: Bobrick B165-1860.

~~X.U.~~ Accessory No. 23 Robe/Towel Hook: Bobrick B76717.

END OF SECTION 10800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguishers.
- B. Related Sections:
 - 1. Section 104416 "Fire Extinguishers."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of fire protection cabinet indicated.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Size: 6 by 6 inches (150 by 150 mm) square.
- E. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire protection cabinets including, but not limited to, the following:
 - a. Schedules and coordination requirements.

1.6 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.
- C. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.7 SEQUENCING

- A. Apply vinyl lettering on field-painted, fire protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
 - 1. Sheet: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.
- D. Copper-Alloy Brass Sheet: ASTM B 36/B 36M, alloy UNS No. C26000 (cartridge brass, 70 percent copper).
- E. Copper-Alloy Bronze Sheet: ASTM B 36/B 36M, alloy UNS No. C28000 (muntz metal, 60 percent copper).
- F. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3, [3] [6] mm thick.

- G. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick.
- H. Break Glass: Clear annealed float glass, ASTM C 1036, Type I, Class 1, Quality q3, 1.5 mm thick, single strength.
- I. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.
- J. Wire Glass: ASTM C 1036, Type II, Class 1, Form 1, Quality q8, Mesh m1 (diamond), 6 mm thick.
- K. Acrylic Bubble: One piece.

2.2 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Products: Subject to compliance with manufacturer's requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fire End & Croker Corporation;
 - b. J. L. Industries, Inc., a division of Activar Construction Products Group;
 - c. Kidde Residential and Commercial Division, Subsidiary of Kidde plc;
 - d. Larsen's Manufacturing Company;
 - e. Modern Metal Products, Division of Technico Inc.;
 - f. Moon-American;
 - g. Potter Roemer LLC;
 - h. Watrous Division, American Specialties, Inc.;
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
 - 1. Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as drywall bead.
- E. Door Glazing: Tempered float glass (clear)
- F. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- G. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
3. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
4. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
5. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
 - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
6. Alarm: Manufacturer's standard alarm that actuates when fire protection cabinet door is opened and that is powered by batteries.

H. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet and door.
2. Steel: Baked enamel or powder coat.

2.3 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 1. Weld joints and grind smooth.
 2. Provide factory-drilled mounting holes.
 3. Prepare doors and frames to receive locks.
 4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. 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.

2.5 STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Fire Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed fire protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.

3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

C. Identification: Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 10441: FIRE EXTINGUISHERS

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of fire extinguishers, cabinets and accessories is indicated on drawings.
- B. Definition: "Fire extinguishers" as used in this section refers to units which can be hand-carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems.
- C. Types of products required include:
 - 1. Fire extinguishers.
 - 2. Mounting brackets.

1.3 QUALITY ASSURANCE:

- A. Single Source Responsibility: Obtain products in this section from one manufacturer.
- B. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating and classification of extinguishers indicated.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. J. L. Industries.
 - 2. Larsen's Mfg. Co.
 - 3. Johnson-Lee, Division of W.F. Lee Corp.

2.2 FIRE EXTINGUISHERS:

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.
- B. Abbreviations indicated below to identify extinguisher types relate to UL classification and rating system and not, necessarily, to type and amount of extinguishing material contained in extinguisher.

- C. "Cosmic: Multi-Purpose Dry Chemical, Model Cosmic 5E", (UL Rating: 3A-40BC).in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS:

- A. Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.
- B. Provide brackets for extinguishers not located in cabinets and for those located in cabinets, where indicated or required.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
- C. Where exact location of bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.

3.2 IDENTIFICATION:

- A. Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHERS" applied to wall surface. Letter size, style and location as selected by Architect.

END OF SECTION 10441

SECTION 10 71 14 - METAL SUN SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Modular, shop-fabricated, metal sun shades to mount on exterior building walls.
- B. Related sections:
 - 1. Section 04 20 00 - Unit Masonry.
 - 2. Section 051200 – Structural Steel

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A36 – Carbon Structural Steel.
 - 2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 3. ASTM A526 - Sheet Steel, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
 - 4. ASTM A792 - Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 5. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 6. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 7. ASTM B221 – Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 5. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 - 9. ASTM D2794 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - 10. ASTM D3363 - Film Hardness by Pencil Test.

1.3 SUBMITTALS

- A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 - 1. Product data for sun shade components and finish.
 - 2. Shop drawings showing layout, dimensions, spacing of components, and anchorage and installation details.

3. Calculations for support system.
4. Sample: 24 by 24 inches minimum size sample of sun shade panel illustrating design, fabrication workmanship, and selected color coating.
5. Copy of warranty specified in Paragraph 1.5 for review by Architect.

1.4 QUALITY ASSURANCE

- A. Design structural support framing components for sun shades under direct supervision of professional structural engineer.
- B. Installer qualifications: Approved by manufacturer for installation of sun shade system.

1.5 WARRANTY

- A. Provide in accordance with Section 01 77 00 - Closeout Procedures:
 1. 20-year warranty for factory finish against cracking, peeling, and blistering under normal use.

PART 2 - PRODUCTS

- 2.1 Aluminum sun Screen basis of design – subject to compliance with requirement provide product indicated on drawing or approved equivalent.

2.2 MATERIALS

- A. Steel bar stock: ASTM A36.
- B. Steel tubing: ASTM A500, Grade B.
- C. Steel sheet: ASTM A526 galvanized or ASTM A792 Galvalume.
- D. Extruded aluminum: ASTM B221, Alloy 6063, Temper T-6.
- E. Sheet aluminum: ASTM B209, Alloy 6063, Temper T-6.

2.3 SUN SHADE SYSTEM

- A. Type: Aluminum sun shades consisting of modular framed panels with louver infill and outriggers for mounting on exterior wall surfaces.
- B. Sun shade panel: Modular panel with perimeter frame.
 1. As indicated on Drawings and approved shop drawings.
 2. Panel infill: Inclined, flanged louvers welded to cross bars.
 - a. Direct visual screening: 80 percent.
- C. Support system: Provide outriggers or other means for support of sun shade panel fabricated from same material as panel. System shall be designed to resist applicable dead, live, wind, and seismic loads.

1. Type: Straight projecting outriggers.
 2. Size: As required to provide sufficient structural support of panels.
- D. Fasteners: Stainless steel bolts, studs, and other types of size and spacing as recommended by manufacturer for specific condition and detailed on approved shop drawings.

2.4 FACTORY FINISH

- A. Sun shade panels, outriggers, and other components shall receive electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
1. Minimum hardness measured in accordance with ASTM D3363: 2H.
 2. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.
 3. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than [3/16 inch] [5 mm] undercutting.
 4. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.
- B. Color: Selected by Architect from manufacturer's standard range.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to fabrication, field verify required dimensions.
- B. Coordinate sun shade installation with provision of exterior wall system to ensure proper structural support is provided, attachment of sun shades is compatible with substrate, and weathertightness of exterior envelop is maintained.

3.2 INSTALLATION

- A. Install sun shades in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Insulate dissimilar metals to prevent electrolysis with bituminous paint or non-absorptive gasket to prevent contact.
- C. Allow for thermal expansion and contraction of metal components.
- D. Install shade panels plumb, level, free from distortion, and aligned with building elements and adjacent shade panels.
- E. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

- F. Attach shade panels to outriggers with appropriate fasteners for secure, permanent installation.
- G. After installation, touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION 107114

SECTION 124816 - ENTRANCE FLOOR GRILLES

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 recessed floor grilles and frames.

1.3 COORDINATION

- A. Coordinate size and location of recesses in concrete to receive floor grilles and frames.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for entrance floor grilles and foot grilles.
- B. Shop Drawings:
 - 1. Items penetrating floor grilles and frames, including door control devices.
 - 2. Divisions between grille sections.
 - 3. Perimeter floor moldings.
- C. Samples: For the following products, in manufacturer's standard sizes:
 - 1. Floor Grille: Assembled section of floor grille.
 - 2. Frame Members: Sample of each type and color.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For floor grilles and frames to include in maintenance manuals.

1.6 FIELD CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or an approved equal:

2.2 ENTRANCE FLOOR GRILLES, GENERAL

- A. Structural Performance: Provide floor grilles and frames capable of withstanding the following loads and stresses:
 - 1. Uniform floor load of 300 lbf/sq. ft. (14.36 kN/sq. m).
 - 2. Wheel load of 350 lb (159 kg) per wheel.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

2.3 FLOOR GRILLES

- A. General: Provide manufacturer's standard floor-grille assemblies consisting of treads of type and profile indicated, interlocked or joined together by cross members, and with support legs (if any) and other components needed to produce a complete installation.
- B. Aluminum Floor Grilles: Provide manufacturer's standard floor grilles with extruded members, top-surfaced tread rails, and as follows:
 - 1. Tread Rails: Extruded-aluminum tread rails.
 - a. Aluminum Color: As selected by Architect from full range of industry colors and color densities.
 - 2. Top Surface: Serrated aluminum.
 - a. Top Surface Color: Match tread rail.
 - 3. Grille Size: As shown on drawing.
- C. Lockdown: Manufacturer's standard.

2.4 FRAMES

- A. Provide manufacturer's standard frames of size and style for grille type, for permanent recessed installation in subfloor, complete with installation anchorages and accessories. Unless otherwise indicated, fabricate frame of same material and finish as grilles.

2.5 SUPPORT SYSTEM

- A. Level Bed Applications: Provide manufacturer's standard, vinyl cushion support system.

- B. Drainage Pit Applications: Provide manufacturer's special deep-pit frame and support extrusion system with intermediate support beams, sized and spaced as recommended by manufacturer for indicated spans and equipped with vinyl support cushions.

2.6 DRAIN PANS

- A. Provide manufacturer's standard, 0.060-inch- (1.52-mm-) thick, stainless-steel sheet drain pan with NPS 2 (DN 50) drain outlet for each floor-grille unit. Coat bottom of pan with protective coating recommended by manufacturer.

2.7 MATERIALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15.
- B. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6061-T6 or Alloy 6063-T5, T6, or T52 as standard with manufacturer. Coat surface of frame in contact with cementitious materials with manufacturer's standard protective coating.
- C. Stainless-Steel Angles: ASTM A 276 or ASTM A 479/A 479M, corrosion resistant, Type 304.

2.8 FABRICATION

- A. Shop fabricate floor grilles to greatest extent possible in sizes as indicated. Unless otherwise indicated, provide each grille as a single unit; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in grilles are necessary, space symmetrically and away from normal traffic lanes.
- B. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

2.9 ALUMINUM FINISHES

- A. Mill finish.
- B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm AA-M12C22A31, Class II, 0.010 mm or thicker.
- C. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, size, minimum recess depth, and other conditions affecting installation of floor grilles and frames.

- B. Examine roughing-in for drainage piping systems to verify actual locations of piping connections before floor grille and frame and drain pan installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install recessed floor grilles and frames and drain pans to comply with manufacturer's written instructions at locations indicated and with top of floor grilles and frames in relationship to one another and to adjoining finished flooring as recommended by manufacturer. Set floor-grille tops at height for most effective cleaning action.[Coordinate top of floor-grille surfaces with doors that swing across grilles to provide clearance under door.]

3.3 PROTECTION

- A. After completing frame installations, provide temporary filler of plywood or fiberboard in floor-grille recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124816