

Project Manual for:

West Bradford Township Additions and Renovations to the Administration Building

1385 Campus Drive
Downingtown, PA 19335

For Construction
January 26, 2021
(contains all changes made during bidding)

Board of Supervisors

Laurie W. Abele
Jack M. Hines, Jr.
Kevin Houghton

Township Manager

Justin Yaich

Kimmel Bogrette Architecture + Site

Volume 1 of 2, Divisions 0 to 14 and 31 to 33

SECTION 00-0103 – PROJECT DIRECTORY

OWNER

West Bradford Township
Justin Yiach, Township Manager
1385 Campus Drive
Downingtown, PA 19335
Phone: 610-269-4174

ARCHITECT

Kimmel Bogrette Architecture + Site
Jonathan Trump, Project Architect
482 Norristown Road, Suite 200
Blue Bell, PA 19422
Phone: (610) 834-7805
e-mail: jtrump@kimmel-bogrette.com

STRUCTURAL ENGINEER

Baker Ingram & Associates
Larry Baker
1547 Oregon Pike
Lancaster, PA
Phone: (717) 290-7400
e-mail: lbaker@bakeringram.com

MEP ENGINEER

Sharpe Engineering, Inc.
Nate Bailey, Mechanical – Ryan Fronheiser, Electrical
130 Futura Drive, Suite 200
Limerick Twp, PA 19464
Phone: 610-489-8212
e-mail: rfronheiser@sharpe-eng.com nbailey@sharpe-eng.com

CIVIL ENGINEER

Edward B. Walsh and Associates, Inc.
Theodore J. Gacomis, PE., CPESC.
855 Springdale Drive, Suite 202
Exton, PA. 19341
Fax: 610-903-0080
E-Mail: tgacomis@ebwalshinc.com

TABLE OF CONTENTS

INTRODUCTORY PAGES

00-0100	Cover	1
00-0103	Project Directory	1
00-0110	Table of Contents	5

SECTION 00 – BIDDING AND CONTRACT REQUIREMENTS

Pages

00-1100	Advertisement for Bid	2
00-2100	AIA A701 – Instructions to Bidders	6
00-2110	AIA A701 – Supplementary Instructions to Bidders	5
00-4100	Bid Document Checklist	1
00-4101	Form For Bid – General Construction	4
00-4102	Form For Bid – Mechanical Construction	3
00-4103	Form For Bid – Electrical Construction	3
00-4104	Form For Bid – Plumbing Construction	3
00-5200	AIA A101 – Owner / Contractor Agreement	8
00-5210	AIA A201 – General Conditions	40
00-5220	AIA A201 – Supplementary General Conditions	36
00-5230	Time for Completion	2
00-5240	Liquidated Damages	2
00-5250	AIA A305 – Contractor’s Qualification Statement	4
00-5260	AIA A310 – Bid Bond	2
00-5270	AIA A312 – Payment Bonds	4
00-5271	AIA A312 – Performance Bonds	4
00-5280	AIA G706 – Contractor’s Payment of Debts and Claims	1
00-5281	AIA G706A – Contractor's Affidavit of Release of Liens	1
00-5290	AIA G707 – Consent of Surety to Final Payment	1
00-5291	AIA G707A – Consent of Surety to Partial Release	1
00-5310	Affidavit of Non-Collusion for Contractor	2
00-5320	Contractor's Waiver of Right to File Mechanic's Liens	2
00-5400	Prevailing Wage Rates	13

SECTION 01 – GENERAL REQUIREMENT

01-1000	Summary	5
01-1200	Contracts Summary	7
01-1201	Prime Contract Checklist	4
01-2200	Unit Prices	2
01-2300	Alternates	2
01-2500	Substitutions	5
01-2600	Contract Modification Procedures	3
01-2900	Payment Procedures	6
01-3100	Project Management and Coordination	14
01-3200	Construction Progress Documentation	13
01-3233	Photo Documentation	2
01-3300	Submittal Procedures	14
01-3400	Coordination Drawings	9
01-4000	Quality Requirements	12
01-4100	Mock Up Panels	2

01-4200	References	3
01-5000	Temporary Facilities and Controls	17
01-5639	Temporary Tree Protection	5
01-7300	Execution	13
01-7419	Construction Waste Management and Disposal	6
01-7700	Closeout Documents	8
01-7823	Operations and Maintenance Data	10
01-7839	Project Record Documents	16
01-7900	Demonstration and Training	5

SECTION 2 - EXISTING CONDITIONS

02-1000	Geotechnical Report (included for reference)	36
02-4116	Structure Demolition	6

SECTION 3 - CONCRETE

03-3000	Cast-In-Place Concrete	16
---------	------------------------	----

SECTION 4 - MASONRY

04-7321	Full Bed Masonry Veneer	4
04-7325	Thin Clad Masonry Veneer	9

SECTION 5 - METALS

05-1200	Structural Steel	7
05-4000	Cold Formed Metal Framing	13
05-5150	Metal Access Ladders	5
05-5213	Metal Railings	8

SECTION 6 - WOOD AND PLASTIC

06-1053	Misc Rough Carpentry	5
06-1600	Sheathing	8
06-1753	Wood Trusses	9
06-4023	Interior Finish Carpentry	7
06-4116	Interior Architectural Millwork	8

SECTION 7 - THERMAL PROTECTION

07-1120	Under Slab Vapor Barrier	2
07-1416	Fluid Applied Waterproofing	4
07-2100	Building Insulation	5
07-2129	Spray Foam Insulation	6
07-2419	EIFS	16
07-2715	Fluid Applied Weather Barrier	10
07-4113	Standing Seam Metal Roof	11
07-7100	Roof Specialties	8
07-7253	Snow Bars	2
07-8413	Penetration Fireproofing	4
07-9200	Joint Sealants	7

SECTION 8 - DOORS AND WINDOWS

08-1113	Hollow Metal Doors and Frames	9
08-1416	Flush Wood Doors	8
08-1423	Clad Commercial Doors	5
08-5213	Clad Wood Windows	5
08-7100	Door Hardware	19
08-7113	Auto Door Openers	7
08-8000	Glazing	6
08-8300	Mirrors	5

SECTION 9 – FINISHES

09-2216	Non Load Bearing Steel Framing	8
09-2900	Gypsum Board Assemblies	8
09-3000	Ceramic Tile	13
09-5123	Acoustical Tile Ceilings	9
09-6513	Resilient Wall Base and Accessories	6
09-6519	Luxury Vinyl Tile	5
09-6813	Carpet Tile	6
09-9123	Painting	11

SECTION 10 – SPECIALTIES

10-2116	Toilet Compartments	4
10-2215	Glass Partitions	5
10-2800	Toilet and Bath Accessories	4
10-7500	Flagpoles	5

SECTION 11 – EQUIPMENT

11-5213	Projection Screens	5
---------	--------------------	---

SECTION 12 – FURNISHINGS

12-2413	Roller Shades	7
---------	---------------	---

SECTION 13 – SPECIAL CONSTRUCTION

13-2168	Bullet Resistant Construction	4
---------	-------------------------------	---

SECTION 14 – ELEVATORS

Not Applicable

SECTION 21 – FIRE SUPPRESSION

Refer to Volume 2 of 2

SECTION 22 – PLUMBING

Refer to Volume 2 of 2

SECTION 23 – HVAC

Refer to Volume 2 of 2

SECTION 26 - ELECTRICAL

Refer to Volume 2 of 2

SECTION 27 - COMMUNICATIONS

Refer to Volume 2 of 2

SECTION 28 - ELECTRONIC SAFETY AND SECURITY

Refer to Volume 2 of 2

SECTION 31 - EARTHWORK

31-1000	Site Clearing	6
31-2000	Earth Moving	14
31-5000	Excavation Support and Protection	5

SECTION 32 - EXTERIOR IMPROVEMENTS

32-1216	Asphalt Paving	8
32-1313	Concrete Paving	12
32-9200	Turf and Grasses	9

SECTION 33 - UTILITIES

33-0500	Common Work Results for Utilities	2
33-4100	Storm Utility Drainage Piping	4

END OF SECTION

**ADVERTISEMENT FOR BIDS – NOTICE TO CONTRACTORS:
WEST BRADFORD TOWNSHIP – ADDITIONS**

Sealed bids will be received by West Bradford Township via PennBid on **November 17, 2020** at 2PM for the additions and renovations to the existing Administration and Building and all associated site work. Bids will be reviewed privately by the Architect and Township and will be made public through PennBid by 5:00 PM the same day. Bids will be received for the following construction contracts:

- A. General Construction
- B. Mechanical Construction
- C. Electrical Construction
- D. Plumbing Construction, including Fire Protection

A non-mandatory Pre-Bid Conference will be held at the Township Building at 10:00 AM, prevailing time on October 20, 2020. Visitors to the facility will be required to follow all COVID procedures currently recommended by the State. A site tour will be conducted after the conference. The purpose of the Pre-Bid meeting will be to address and consider all questions posed by bidders and disseminate timely information. The meeting will be open to all prime contractors and subcontract bidders. All information given at this meeting will be considered part of the contract documents, via addendum, and is to be included in the bids.

The bidding process will be managed through PennBid (www.ebidexchange.com). All bid documents will be available for download starting October 15, 2020. All addendums and RFI's will be managed through PennBid as well. No RFI's will be considered after the date indicated at the pre-bid meeting or seven days prior to the bid submission deadline.

Bids must be accompanied by bid security in the amount of 10% of the Base Bid in one of the following forms naming West Bradford Township as payee or obligee as applicable: certified check, bank cashier's check, letter of credit, or bid bond in the required form by a corporate surety authorized to do business in the Commonwealth of Pennsylvania and acceptable to the Township.

This project is subject to the provisions of (a) the Pennsylvania Prevailing Wage Act as amended; (b) the Steel Products Procurement Act – only steel products permitted thereunder shall be used or supplied in performance of the Contractor Subcontracts hereunder; (c) the Reciprocal Limitations Act, Act 146 of 1986, which prohibits the use of supplies, equipment or materials manufactured in a state or territory which discriminates against the purchase of such supplies, equipment or materials manufactured in the Commonwealth of Pennsylvania in said state or territory's public buildings and other works; (d) the Trade Practices Act of July 23, 1968, P.L.

686 prohibiting use of aluminum or steel products made in a foreign country that discriminates against such products manufactured in the Commonwealth of Pennsylvania; (e) West Bradford Township shall require the submission of a Non-collusion Affidavit with the Bid. (f) the Pennsylvania Human Relations Act of 1955, P.L. 744, No. 222, as amended, which prohibits any bidder from discriminating against any employee, applicant for employment, contractor or any other person because of race, color, religious creed, ancestry, national origin, age or sex; (g) Public Works Employment Verification Act" (Act 127 of 2012, 43 P.S. §167.1, *et seq.*) and (h) the Americans with Disabilities Act (Public Law 101-336).

West Bradford Township shall award the contract to the lowest responsible and responsive bidder or shall reject all bids within 90 days following the date of bid opening, and no bidder may withdraw its bid before the expiration of such 90 day period; provided, however, that if the award of the contract is delayed by required approval of another governmental agency, the sale of bonds, or the award of a grant, West Bradford Township shall reject all bids or award the contract to the lowest responsible and responsive bidder within 120 days of the date of bid opening, and no bidder may withdraw its bid before the expiration of such 120 day period. 30 day extensions of the date for the award of the contract may be made by the mutual written consent of the Township and the lowest responsible and responsive bidder. Bids may be withdrawn after opening only as set forth in PA Act 4 Pennsylvania Public Contract Bid Withdrawal Law, 72 P.S. 1601 *et seq.* (Act 4 of 1974), as amended from time to time.

Successful bidder will be required to furnish and pay for satisfactory Performance and Payment Bonds in an amount equal to one hundred percent (100%) of the contract price.

The bids will be awarded by the West Bradford Township Board of Supervisors at a subsequent Board meeting. The Township reserves the right to reject any or all proposals as indicated in the General and Supplementary Conditions included with the Project Specifications.

Justin Yaich, Township Manager

DRAFT AIA® Document A701™ - 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

«West BradfordHampden Township»

« »

THE OWNER:

(Name, legal status and address)

« »« »

« »

THE ARCHITECT:

(Name, legal status and address)

« »« »

« »

TABLE OF ARTICLES

- 1 DEFINITIONS
- 2 BIDDER'S REPRESENTATIONS
- 3 BIDDING DOCUMENTS
- 4 BIDDING PROCEDURES
- 5 CONSIDERATION OF BIDS
- 6 POST-BID INFORMATION
- 7 PERFORMANCE BOND AND PAYMENT BOND
- 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-

stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or

Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

SECTION 00 -2110 - AIA-A701 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.01 INSTRUCTIONS TO BIDDERS - AIA DOCUMENT A701

The Instructions to Bidders of the American Institute of Architects, AIA Document A 701, 1997 bound herein and hereinafter referred to as the "AIA Instructions to Bidders," and paragraphs of this Section form the Instructions to Bidders of the Contract and shall apply to all prime Contractors and all Subcontractors. Where any article, paragraph, or subparagraph in the AIA Instructions to Bidders is supplemented by one of the following paragraphs, the provisions shall be considered as added thereto. Where any article, paragraph, or sub-paragraph in the AIA Instructions to Bidders is amended, voided, or superseded by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph, not so amended, shall remain in effect.

B. ARTICLE 3 - BIDDING DOCUMENTS

1. Section 3.2.2 - Amend the paragraph as follows:
Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect by the dates given at the pre-bid and indicated in Addenda. The Bidder must carefully examine the site of the Project and be familiar with the conditions under which the work, or any part thereof, is to be performed and the conditions which must be fulfilled in the furnishing and / or installing, erecting or constructing any or all items of the Project.
2. Section 3.4 - Add the following sub-paragraph:
"3.4.5 Questions answered at the Pre-bid meeting are not binding and are not to be included in the bidding documents unless verified in writing by Addendum."

C. ARTICLE 4 - BIDDING PROCEDURES

1. Section 4.1 - Add the following sub-paragraphs:
"4.1.8 In the event there is a discrepancy between the unit prices and the extended totals, the unit prices shall prevail. In the event there is an error of the summation of the extended totals, the computation by the OWNER of the extended totals shall govern."
"4.1.9 If required by the Bid Documents, The Schedule of Values, part of the Bid Form, shall be fully completed with the Bid Package (including amounts for both material and labor costs for each Division).

2. Paragraph 4.2.1 is amended by the addition of the following sentence:
"Bid security shall be 10% of the amount of the Base Bid. The following bid security forms will be accepted: (1) Bid Bond (2) Certified Check (3) Bank Cashier Check (4) Letter of Credit."

D. ARTICLE 5 – CONSIDERATION OF BIDS

1. Section 5.2 is amended by the addition of the words "or portions thereof" after
"The Owner shall have the right to reject any or all Bids."
2. Add the following to Section 5.2:
"The OWNER shall have the right to reject bids on the following basis:
 - .1 Availability of Funds: Pursuant to statutory requirements, any contract resulting from this bid shall be subject to the availability and appropriation of sufficient funds annually.
 - .2 Multiple Bids for the Same Contract Not Allowed: More than one bid from an individual, a firm, or partnership, a corporation or association under the same or different names shall not be considered.
 - .3 Unbalanced Bids: Bids which are obviously unbalanced may be rejected.
 - .4 Unsatisfactory Past Performance: Bids received from bidders who have defaulted on contracts within the time scheduled or who have performed prior work for the OWNER in an unacceptable manner, may be rejected.
 - .5 Failure To Enter Contract: Should the bidder, to whom the contract is awarded, fail to enter into a contract within 15 days, Sundays and holidays excepted, the OWNER may then, at its option, accept the bid of the next lowest responsible bidder."

3. Article 5 is supplemented by the addition of the following Section:

Section 5.4 – Required Information

- 5.4.1 The Government Entity may require the apparent lowest responsible bidder, in addition to other information, to furnish the following items:
 - a. Description of its experience with projects of comparative size, complexity, and cost within recent years and, demonstration of Contractor's ability and capacity to perform a substantial portion of the project with its own forces;

- b. Documentation from previous projects regarding: timeliness of performance; quality of work; extension requests; work, including fines and penalties imposed and payment thereof; liens filed; history of claims for extra work; contract defaults; together with explanations of same;
- c. Identification and description of any projects within the previous five years that the apparent lowest bidder was determined by a Government Entity not to be a responsible bidder, the reasons given by such Government Entity therefor, together with an explanation thereof;
- d. An adequate demonstration of financial responsibility, which may include, in the Government Entity's discretion, a Certified Financial Statement prepared by a Certified Public Accountant, to assure that the apparent lowest bidder possesses adequate resource and availability of credit and the means and ability to procure insurance and bonds required for the project;
- e. Disclosure of any suspension or revocations of any professional license of any director, officer, owner, or managerial employee of the apparent lowest bidder, to the extent that any work to be performed is within the field of such licensed profession;
- f. Disclosure of any and all OSHA violations within the previous three years, as well as all notices of OSHA citations filed against the apparent lowest bidder in the same three year period, together with a description and explanation of remediation or other steps taken regarding such violations and notices of violation;
- g. Disclosure of any and all violations within the previous five years pertaining to unlawful intimidation or discrimination against any employee by reason of race, creed, color, disability, sex or national origin and/or violations of an employee's civil rights or equal employment opportunities;
- h. Certification and list of equipment owned and/or leased by the apparent lowest bidder that will be utilized on the project, together with maintenance records and such assurances regarding safety thereof as the Owner considers appropriate;
- i. Disclosure of any litigation (including copies of pleadings) in which the apparent lowest bidder has been named as a Defendant or third party defendant in an action involving a claim for personal injury or wrongful death arising from performance of work related to any project in which it has been engaged within the previous five years;

- j. Disclosure of violations of the Workers' Compensation Law, including, but not limited to the failure to provide proof of Workers' Compensation or Disability coverage and/or any lapses thereof;
- k. Disclosure of any criminal convictions or criminal indictments, involving the apparent lowest bidder, its officers, directors, owners and/or managerial employees, within the past five years;
- l. Disclosure of any violations within the past five years or pending charges concerning federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations;
- m. Identify all work to be subcontracted when requested by the Government Entity identifying the firm(s) to which the work will be Subcontracted. All Subcontractors are subject to the approval of the Government Entity. The approval of all Subcontractors by the Government Entity, as provided in the general conditions, shall be subject to the same evaluation of responsibility.

In the event that the amount of the lowest bid appears disproportionately low when compared with estimates undertaken by or on behalf of the Government Entity and/or compared to other bids submitted, the Government Entity reserves the right to inquire further of the apparent lowest bidder to determine whether the bid contains mathematical errors, omissions and/or erroneous assumptions, and whether the apparent lowest bidder has the capability to perform and complete the contract for the bid amount.

Notwithstanding the above, the Government Entity reserves the right to reject any and all bids as elsewhere provided herein or for other lawful reasons not set forth herein.

E. ARTICLE 6 – POST-BID INFORMATION

1. Section 6.1. – Contractor's Qualification Statement is amended as follows:
Add new sentence as follows: "The Owner shall have the right to take such steps as it seems necessary to determine the ability of the Bidder to perform the work and the Bidder shall furnish the Owner all such information and data for this purpose as the Owner may request. The right to reject any bid where the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the bid documents shall remain solely with the Owner."
2. Section 6.2. – Owner's Financial Capability is amended by the deletion of the section in its entirety.

3. Sub-Paragraph 6.3.3 is amended by the deletion the last sentence of the sub-paragraph in its entirety.

F. ARTICLE 7 – PERFORMANCE BOND AND PAYMENT BOND

1. Sub-Paragraph 7.1.1 is amended by the deletion of the beginning clause: "If stipulated in the Bidding Documents," Sub-paragraph 7.1.1 shall be amended with the addition of the following sentence at the end of the sub-paragraph: "Mandatory performance bond and payment bond shall be 100% of the Contract."
2. Sub-Paragraph 7.1.2 is amended by the deletion of the beginning clause: "If the furnishings of such bonds is stipulated in the Bidding Documents,"
3. Sub-paragraph 7.2.1 shall be deleted and replaced with the following: "The Bidder shall deliver the required bonds to the Owner within 10 days of notice of intent to award the contract."

G. ARTICLE 8 – FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

1. Replace AIA A101 Standard Form of Agreement Between Owner and Contractor with AIA A132 Standard Form of Agreement Between Owner and Contractor with Construction Manager

END OF SECTION 00-2110

SECTION 00-4100 – BID DOCUMENT CHECKLIST

<u>ITEM</u>	<u>READ, SIGNED AND SUBMITTED</u>
Completed Form for Bid with Add Alternates	-----
Completed Contractor’s Qualification Statement AIA A305. (include references and list of similar project completed and Status of Present Contracts)	-----
Completed Bid Bond AIA – A310 with Power of Attorney	-----
Completed Affidavit of Non-Collusion, Section 00-5310	-----
Unexecuted AIA – A312 Performance and Payment Bonds or Proof of Bonding / Consent of Surety	-----
Proof of Insurance (in amounts requested in specs) on Insurer’s Standard Forms	-----
Contractor’s Waiver of Right to File Mechanic’s Liens (00 53 20) *	
Contractor’s Affidavit of Release of Liens (G706A) *	

Additional Notes:

For corporate bidders, corporate resolution authorizing the Bid are attached to Proposal Pages. For joint venture bidders, separate Ownership Disclosure Statements are included in the Proposal Pages for each member.

Evidence, in the case of a corporation organized under the laws of any other state, that the bidder has been issued a certificate of authority to transact business in this State.

* These will be required by the successful bidder at contract signing.

END OF SECTION 00-4100

SECTION 00-4101 – FORM FOR BIDCONTRACT #1 – GENERAL BUILDING CONSTRUCTION

- A. The undersigned, having carefully examined the premises and the Drawings and Project Manual, and having fully informed himself as to all laws, ordinances, and regulations affecting the work, will furnish all labor and materials and perform all work required for the construction of:

Additions and Renovations to the West Bradford Township Building
1385 Campus Drive
Downingtown, PA 19335

in accordance with the Drawings and Specifications, made available through PennBid, prepared by Kimmel Bogrette Architecture + Site, Baker Ingram, Sharpe Engineering and E.B. Walsh and Associates for the Contract Price specified below, subject to additions and deductions according to the terms of the Project Manual.

- B. This bid includes addenda numbered (if none, so state).

- C. The proposed Contract Price (Base Bid)

is _____dollars.

(\$ _____).

Base bid valid for 90 days and as per the Bid Advertisement.

- D. The proposed price for the following Alternates:

Alternate #G1 – Fire Pump Room

The base bid for the project includes no fire pump and fire pump room. Provide the cost to construct a fire pump room, if required, as indicated in the contract documents.

Alternate #G1: Add _____ dollars

- E. Unit Prices:

- a. Unit Price #1 – Unsuitable Soils

If the Testing Agency determines that unsuitable soils exist and need to be replaced (other than areas already indicated for replacement in the Geotechnical Report and Structural Drawings) provide the cost to remove and dispose of the unsuitable soil,

replace with appropriate and engineer approved fill and compact as per the specifications.

Remove unsuitable soil, fill placement & compaction \$_____ per cubic yard up to 10 cyd

Remove unsuitable soil, fill placement & compaction \$_____ per cubic yard 11 to 25 cyd

Remove unsuitable soil, fill placement & compaction \$_____ per cubic yard 26 cyd and over

- b. Unit Price #2 – Rock Excavation
Excavation is Unclassified. See geotechnical report included in the specifications for reference only.
- F. Upon opening of bids, the apparent low bidder will be notified by the Owner of the intent of the Owner to award the Contract to the low bidder. If the undersigned is notified of such intent, he agrees to submit the required payment and performance bonds in satisfactory form. The undersigned agrees to provide the necessary insurance certificate within 10 days of notice of intent to award the Contract.
- G. The undersigned agrees, if awarded the Contract, to begin work immediately upon receipt of the notice to proceed. Notice will not be issued to the Contractor until after the Contractor has delivered the necessary certificate of insurance to the Owner. The Contractor agrees to complete the entire work to the satisfaction and approval of the Owner and Architect within the contracted time frame as described in Section 00 52 40 – Liquidated Damages.
- H. If the Owner accepts this proposal, the undersigned agrees to submit, within ten (10) business days, a Construction Schedule as specified in Section 01-3200 of these construction documents.
- I. The undersigned agrees, that if he is selected as a Contractor, he will within 15 days, Saturdays, Sundays and Legal Holidays excluded, after presentation thereof by the Owner, execute a contract in accordance with terms of this bid.
- J. The Contractor in charge of the General Construction of this project shall have direct control and management of all the construction operations and shall be responsible for the satisfactory overall performance of all his suppliers and subcontractors, as well as coordination of work performed.
- K. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.
- L. In the event that changes are required in the work, including increases or decreases in the amount of items shown in the contract drawings, that adjustment shall be made according to Article 12 of the General Conditions of the Contract for Construction.
- M. The undersigned agrees that time is of the essence in this Contract and that great energy and diligence shall characterize all operations carried out under this Contract.

By: _____ Date: _____

(Signature)

(Name and Title)

(Name of Organization)

(Business Address)

(Corporate Seal)

Note: If the bidder is a corporation, indicate State of incorporation under signature and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION 00-4101

SECTION 00-4102 – FORM FOR BID CONTRACT #2 – MECHANICAL CONSTRUCTION

- A. The undersigned, having carefully examined the premises and the Drawings and Project Manual, and having fully informed himself as to all laws, ordinances, and regulations affecting the work, will furnish all labor and materials and perform all work required for the construction of:

Additions and Renovations to the West Bradford Township Building
1385 Campus Drive
Downingtown, PA 19335

in accordance with the Drawings and Specifications, made available through PennBid, prepared by Kimmel Bogrette Architecture + Site, Baker Ingram, Sharpe Engineering and E.B. Walsh and Associates for the Contract Price specified below, subject to additions and deductions according to the terms of the Project Manual.

- B. This bid includes addenda numbered (if none, so state).

- C. The proposed Contract Price (Base Bid)

is _____ dollars.

(\$ _____).

Base bid valid for 90 days and as per the Bid Advertisement

- D. The proposed price for the following Alternates:

Alternate #M1 – Fire Pump Room

The base bid for the project includes no fire pump and fire pump room. Provide the cost to construct a fire pump room, if required, as indicated in the contract documents.

Alternate #M1: Add \$ _____

- E. Unit Prices:

- a. Unit Price #1 – Not Applicable

- F. Upon opening of bids, the apparent low bidder will be notified by the Owner of the intent of the Owner to award the Contract to the low bidder. If the undersigned is notified of such intent, he agrees to submit the required payment and performance bonds in satisfactory form. The undersigned agrees to provide the necessary insurance certificate within 10 days of notice of intent to award the Contract.

- G. The undersigned agrees, if awarded the Contract, to begin work immediately upon receipt of the notice to proceed. Notice will not be issued to the Contractor until after the Contractor has delivered the necessary certificate of insurance to the Owner. The Contractor agrees to complete the entire work to the satisfaction and approval of the Owner and Architect within the contracted time frame as described in Section 00 52 40 - Liquidated Damages.
- H. If the Owner accepts this proposal, the undersigned agrees to submit, within ten (10) business days, a Construction Schedule as specified in Section 01 32 00 of these construction documents.
- I. The undersigned agrees, that if he is selected as a Contractor, he will within 15 days, Saturdays, Sundays and Legal Holidays excluded, after presentation thereof by the Owner, execute a contract in accordance with terms of this bid.
- J. The Contractor in charge of the General Construction of this project shall have direct control and management of all the construction operations and shall be responsible for the satisfactory overall performance of all his suppliers and subcontractors, as well as coordination of work performed.
- K. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.
- L. In the event that changes are required in the work, including increases or decreases in the amount of items shown in the contract drawings, that adjustment shall be made according to Article 12 of the General Conditions of the Contract for Construction.
- M. The undersigned agrees that time is of the essence in this Contract and that great energy and diligence shall characterize all operations carried out under this Contract.

By: _____ Date: _____

(Signature)

(Name and Title) _____

(Name of Organization) _____

(Business Address) _____

(Corporate Seal)

Note: If the bidder is a corporation, indicate State of incorporation under signature and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION 00-4102

SECTION 00-4103 – FORM FOR BID CONTRACT #3 – ELECTRICAL CONSTRUCTION

- A. The undersigned, having carefully examined the premises and the Drawings and Project Manual, and having fully informed himself as to all laws, ordinances, and regulations affecting the work, will furnish all labor and materials and perform all work required for the construction of:

Additions and Renovations to the West Bradford Township Building
1385 Campus Drive
Downingtown, PA 19335

in accordance with the Drawings and Specifications, made available through PennBid, prepared by Kimmel Bogrette Architecture + Site, Baker Ingram, Sharpe Engineering and E.B. Walsh and Associates for the Contract Price specified below, subject to additions and deductions according to the terms of the Project Manual.

- B. This bid includes addenda numbered (if none, so state).

- C. The proposed Contract Price (Base Bid)

is _____dollars.

(\$ _____).

Base bid valid for 90 days and as per the Bid Advertisement.

- D. The proposed price for the following Alternates:

Alternate #E1 – Fire Pump Room

The base bid for the project includes no fire pump and fire pump room. Provide the cost to construct a fire pump room, if required, as indicated in the contract documents.

Alternate #E1: Add _____ dollars

- E. Unit Prices:

- a. Unit Price #1 – Rock Excavation

Excavation is Unclassified. See geotechnical report included in the specifications for reference only.

- b. Unit Price #2 – Duplex Outlet

Bidder shall state on Bid a unit price for furnishing and installing a duplex receptacle outlet. A duplex receptacle outlet shall consist of a duplex receptacle, outlet box,

wallplate and wiring within fifty wire feet of a source of power. Unit price shall reflect an outlet installed during the normal course of installation.

\$ _____ per outlet

- F. Upon opening of bids, the apparent low bidder will be notified by the Owner of the intent of the Owner to award the Contract to the low bidder. If the undersigned is notified of such intent, he agrees to submit the required payment and performance bonds in satisfactory form. The undersigned agrees to provide the necessary insurance certificate within 10 days of notice of intent to award the Contract.
- G. The undersigned agrees, if awarded the Contract, to begin work immediately upon receipt of the notice to proceed. Notice will not be issued to the Contractor until after the Contractor has delivered the necessary certificate of insurance to the Owner. The Contractor agrees to complete the entire work to the satisfaction and approval of the Owner and Architect within the contracted time frame as described in Section 00 52 40 - Liquidated Damages.
- H. If the Owner accepts this proposal, the undersigned agrees to submit, within ten (10) business days, a Construction Schedule as specified in Section 01 32 00 of these construction documents.
- I. The undersigned agrees, that if he is selected as a Contractor, he will within 15 days, Saturdays, Sundays and Legal Holidays excluded, after presentation thereof by the Owner, execute a contract in accordance with terms of this bid.
- J. The Contractor in charge of the General Construction of this project shall have direct control and management of all the construction operations and shall be responsible for the satisfactory overall performance of all his suppliers and subcontractors, as well as coordination of work performed.
- K. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.
- L. In the event that changes are required in the work, including increases or decreases in the amount of items shown in the contract drawings, that adjustment shall be made according to Article 12 of the General Conditions of the Contract for Construction.
- M. The undersigned agrees that time is of the essence in this Contract and that great energy and diligence shall characterize all operations carried out under this Contract.

By: _____ Date: _____

(Signature)

(Name and Title) _____

(Name of Organization) _____

(Business Address)

(Corporate Seal)

Note: If the bidder is a corporation, indicate State of incorporation under signature and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION 00-4103

SECTION 00-4104 – FORM FOR BID CONTRACT #4 – PLUMBING CONSTRUCTION

- A. The undersigned, having carefully examined the premises and the Drawings and Project Manual, and having fully informed himself as to all laws, ordinances, and regulations affecting the work, will furnish all labor and materials and perform all work required for the construction of:

Additions and Renovations to the West Bradford Township Building
1385 Campus Drive
Downingtown, PA 19335

in accordance with the Drawings and Specifications, made available through PennBid, prepared by Kimmel Bogrette Architecture + Site, Baker Ingram, Sharpe Engineering and E.B. Walsh and Associates for the Contract Price specified below, subject to additions and deductions according to the terms of the Project Manual.

- B. This bid includes addenda numbered (if none, so state).

- C. The proposed Contract Price (Base Bid)

is _____dollars.

(\$ _____).

Base bid valid for 90 days and as per the Bid Advertisement.

- D. The proposed price for the following Alternates:

Alternate #P1 – Fire Pump Room

The base bid for the project includes no fire pump and fire pump room. Provide the cost to construct a fire pump room, if required, as indicated in the contract documents.

Alternate #P1: Add _____ dollars

- E. Unit Prices:

- a. Unit Price #1 – Rock Excavation

Excavation is Unclassified. See geotechnical report included in the specifications for reference only.

- F. Upon opening of bids, the apparent low bidder will be notified by the Owner of the intent of the Owner to award the Contract to the low bidder. If the undersigned is notified of such intent, he agrees to submit the required payment and performance bonds in

satisfactory form. The undersigned agrees to provide the necessary insurance certificate within 10 days of notice of intent to award the Contract.

- G. The undersigned agrees, if awarded the Contract, to begin work immediately upon receipt of the notice to proceed. Notice will not be issued to the Contractor until after the Contractor has delivered the necessary certificate of insurance to the Owner. The Contractor agrees to complete the entire work to the satisfaction and approval of the Owner and Architect within the contracted time frame as described in Section 00 52 40 - Liquidated Damages.
- H. If the Owner accepts this proposal, the undersigned agrees to submit, within ten (10) business days, a Construction Schedule as specified in Section 01 32 00 of these construction documents.
- I. The undersigned agrees, that if he is selected as a Contractor, he will within 15 days, Saturdays, Sundays and Legal Holidays excluded, after presentation thereof by the Owner, execute a contract in accordance with terms of this bid.
- J. The Contractor in charge of the General Construction of this project shall have direct control and management of all the construction operations and shall be responsible for the satisfactory overall performance of all his suppliers and subcontractors, as well as coordination of work performed.
- K. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.
- L. In the event that changes are required in the work, including increases or decreases in the amount of items shown in the contract drawings, that adjustment shall be made according to Article 12 of the General Conditions of the Contract for Construction.
- M. The undersigned agrees that time is of the essence in this Contract and that great energy and diligence shall characterize all operations carried out under this Contract.

By: _____ Date: _____

(Signature)

(Name and Title) _____

(Name of Organization) _____

(Business Address)

(Corporate Seal)

Note: If the bidder is a corporation, indicate State of incorporation under signature and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION 00-4104

DRAFT AIA® Document A101™ - 2017

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

AGREEMENT made as of the «**1**» day of «**1**» in the year «**1**»
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«**1**» «**1**» «**1**»
«**1**»
«**1**»
«**1**»

and the Contractor:
(Name, legal status, address and other information)

«**1**» «**1**» «**1**»
«**1**»
«**1**»
«**1**»

for the following Project:
(Name, location and detailed description)

«**West BradfordHampden Township**»
«**1**»
«**1**»

The Architect:
(Name, legal status, address and other information)

«**1**» «**1**» «**1**»
«**1**»
«**1**»
«**1**»

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

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

TABLE OF ARTICLES

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

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

[] The date of this Agreement.

[] A date set forth in a notice to proceed issued by the Owner.

[] Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

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

[] By the following date:

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

Portion of Work	Substantial Completion Date
<input type="text"/>	<input type="text"/>

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item	Price
<input type="text"/>	<input type="text"/>

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

Item	Price	Conditions for Acceptance
<input type="text"/>	<input type="text"/>	<input type="text"/>

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

Item	Price
<input type="text"/>	<input type="text"/>

§ 4.4 Unit prices, if any: (Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
<input type="text"/>	<input type="text"/>	<input type="text"/>

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

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

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

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

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

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

§ 5.1.7 Retainage

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

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

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

<< >>

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

<< >>

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

<< >>

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

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

§ 5.2 Final Payment

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

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

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

<< >>

§ 5.3 Interest

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

<< >> % << >>

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

<< >>

<< >>

<< >>

<< >>

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

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

[] Litigation in a court of competent jurisdiction

[] Other *(Specify)*

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)

<< >>

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner’s representative:

(Name, address, email address, and other information)

<< >>

<< >>

<< >>

<< >>

<< >>

<< >>

§ 8.3 The Contractor’s representative:

(Name, address, email address, and other information)

<< >>

<< >>

<< >>

<< >>

<< >>

<< >>

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

§ 8.5 Insurance and Bonds

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

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™-2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

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

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™-2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date
« »		

.6 Specifications

Section	Title	Date	Pages
« »			

.7 Addenda, if any:

Number	Date	Pages
« »		

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

.8 Other Exhibits:

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

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

<>

[<>] The Sustainability Plan:

Title	Date	Pages
<>	<>	<>

[<>] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
<>	<>	<>	<>

9 Other documents, if any, listed below:

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

<>

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

<>

OWNER (Signature)

<><>

(Printed name and title)

<>

CONTRACTOR (Signature)

<><>

(Printed name and title)

DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«West BradfordHampden Township»

« »

THE OWNER:

(Name, legal status and address)

« »« »

« »

THE ARCHITECT:

(Name, legal status and address)

« »« »

« »

TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

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



INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

Access to Work

3.16, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.4**

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8

Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,

3.12.10.1, 4.2.7, 9.3.2, 13.4.1

Arbitration

8.3.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

Building Information Models Use and Reliance

1.8

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval
13.4.4
Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,
7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,
9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,
11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,
11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,
6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,
9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,
9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1,
13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8,
15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4

Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,
15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY
SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**,
9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR
SUSPENSION OF THE
5.4.1.1, 5.4.2, 11.5, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating
to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,
9.1, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,
12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,
7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,
8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,
14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, **6.1.2**
Contractor's Construction and Submittal
Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2
Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,
10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance

11.1

Contractor's Relationship with Separate Contractors and Owner's Forces

3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4

Contractor's Relationship with the Architect

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

2.2.2, 9.7

Contractor's Right to Terminate the Contract

14.1

Contractor's Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction

Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4

Coordination and Correlation

1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.3.6, 3.11

Copyrights

1.5, **3.17**

Correction of Work

2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1

Correlation and Intent of the Contract Documents

1.2

Cost, Definition of

7.3.4

Costs

2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14

Cutting and Patching

3.14, 6.2.5

Damage to Construction of Owner or Separate Contractors

3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7

Damages for Delay

6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2

Date of Commencement of the Work, Definition of

8.1.2

Date of Substantial Completion, Definition of

8.1.3

Day, Definition of

8.1.4

Decisions of the Architect

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2

Decisions to Withhold Certification

9.4.1, **9.5**, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of

2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Definitions

1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

Delays and Extensions of Time

3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5

Digital Data Use and Transmission

1.7

Disputes

6.3, 7.3.9, 15.1, 15.2

Documents and Samples at the Site

3.11

Drawings, Definition of

1.1.5

Drawings and Specifications, Use and Ownership of

3.11

Effective Date of Insurance

8.2.2

Emergencies

10.4, 14.1.1.2, **15.1.5**

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1

Equipment, Labor, or Materials

1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Execution and Progress of the Work

1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**

Failure of Payment

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work

(See Defective or Nonconforming Work)

Final Completion and Final Payment

4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's

2.2.1, 13.2.2, 14.1.1.4

GENERAL PROVISIONS

1

Governing Law

13.1

Guarantees (See Warranty)

Hazardous Materials and Substances

10.2.4, **10.3**

Identification of Subcontractors and Suppliers

5.2.1

Indemnification

3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

Information and Services Required of the Owner

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,

9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,

14.1.1.4, 14.1.4, 15.1.4

Initial Decision

15.2

Initial Decision Maker, Definition of

1.1.8

Initial Decision Maker, Decisions

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Injury or Damage to Person or Property

10.2.8, 10.4

Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,

9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders

1.1.1

Instructions to the Contractor

3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

Instruments of Service, Definition of

1.1.7

Insurance

6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5,

11

Insurance, Notice of Cancellation or Expiration

11.1.4, **11.2.3**

Insurance, Contractor's Liability

11.1

Insurance, Effective Date of

8.2.2, 14.4.2

Insurance, Owner's Liability

11.2

Insurance, Property

10.2.5, 11.2, 11.4, 11.5

Insurance, Stored Materials

9.3.2

INSURANCE AND BONDS

11

Insurance Companies, Consent to Partial Occupancy

9.9.1

Insured loss, Adjustment and Settlement of

11.5

Intent of the Contract Documents

1.2.1, 4.2.7, 4.2.12, 4.2.13

Interest

13.5

Interpretation

1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written

4.2.11, 4.2.12

Judgment on Final Award

15.4.2

Labor and Materials, Equipment

1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,

5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,

10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes

8.3.1

Laws and Regulations

1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,

9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,

15.4

Liens

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of

12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability

3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,

4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,

11.3, 12.2.5, 13.3.1

Limitations of Time

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,

5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,

9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,

15.1.2, 15.1.3, 15.1.5

Materials, Hazardous

10.2.4, **10.3**

Materials, Labor, Equipment and

1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,

5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,

10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and

Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Mediation

8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1,

15.4.1.1

Minor Changes in the Work

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

MISCELLANEOUS PROVISIONS

13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

Mutual Responsibility

6.2

Nonconforming Work, Acceptance of

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4,
12.2

Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4,
3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4,
8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1,
13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5,
15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3

Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6,
15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections

13.4.1, 13.4.2

Observations, Contractor's

3.2, 3.7.4

Occupancy

2.3.1, 9.6.6, 9.8

Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2,
14.3.1

OWNER

2

Owner, Definition of

2.1.1

Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

Owner, Information and Services Required of the

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2,
9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,
14.1.1.4, 14.1.4, 15.1.4

Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2,
4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1,
7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2,
10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4,
15.2.7

Owner's Insurance

11.2

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

Owner's Right to Carry Out the Work

2.5, 14.2.2

Owner's Right to Clean Up

6.3

**Owner's Right to Perform Construction and to
Award Separate Contracts**

6.1

Owner's Right to Stop the Work

2.4

Owner's Right to Suspend the Work

14.3

Owner's Right to Terminate the Contract

14.2, 14.4

**Ownership and Use of Drawings, Specifications
and Other Instruments of Service**

1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12,
5.3

Partial Occupancy or Use

9.6.6, **9.9**

Patching, Cutting and

3.14, 6.2.5

Patents

3.17

Payment, Applications for

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1,
14.2.3, 14.2.4, 14.4.3

Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,
9.10.3, 14.1.1.3, 14.2.4

Payment, Failure of

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Payment, Final

4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3

Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Payments, Progress

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

PAYMENTS AND COMPLETION

9

Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

PCB

10.3.1

Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Permits, Fees, Notices and Compliance with Laws

2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2

PERSONS AND PROPERTY, PROTECTION OF

10

Polychlorinated Biphenyl

10.3.1

Product Data, Definition of

3.12.2

Product Data and Samples, Shop Drawings

3.11, **3.12**, 4.2.7

Progress and Completion

4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4

Progress Payments

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

Project, Definition of

1.1.4

Project Representatives

4.2.10

Property Insurance

10.2.5, **11.2**

Proposal Requirements

1.1.1

PROTECTION OF PERSONS AND PROPERTY 10

Regulations and Laws

1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

Rejection of Work

4.2.6, 12.2.1

Releases and Waivers of Liens

9.3.1, 9.10.2

Representations

3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1

Representatives

2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1

Responsibility for Those Performing the Work

3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10

Retainage

9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

Review of Contract Documents and Field

Conditions by Contractor

3.2, 3.12.7, 6.1.3

Review of Contractor's Submittals by Owner and Architect

3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2

Review of Shop Drawings, Product Data and Samples by Contractor

3.12

Rights and Remedies

1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, 13.3, 14, 15.4

Royalties, Patents and Copyrights

3.17

Rules and Notices for Arbitration

15.4.1

Safety of Persons and Property

10.2, 10.4

Safety Precautions and Programs

3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4

Samples, Definition of

3.12.3

Samples, Shop Drawings, Product Data and

3.11, 3.12, 4.2.7

Samples at the Site, Documents and

3.11

Schedule of Values

9.2, 9.3.1

Schedules, Construction

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Separate Contracts and Contractors

1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2

Separate Contractors, Definition of

6.1.1

Shop Drawings, Definition of

3.12.1

Shop Drawings, Product Data and Samples

3.11, 3.12, 4.2.7

Site, Use of

3.13, 6.1.1, 6.2.1

Site Inspections

3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4

Site Visits, Architect's

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Special Inspections and Testing

4.2.6, 12.2.1, 13.4

Specifications, Definition of

1.1.6

Specifications

1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14

Statute of Limitations

15.1.2, 15.4.1.1

Stopping the Work

2.2.2, 2.4, 9.7, 10.3, 14.1

Stored Materials

6.2.1, 9.3.2, 10.2.1.2, 10.2.4

Subcontractor, Definition of

5.1.1

SUBCONTRACTORS

5

Subcontractors, Work by

1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

Subcontractual Relations

5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1

Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3

Submittal Schedule

3.10.2, 3.12.5, 4.2.7

Subrogation, Waivers of

6.1.1, 11.3

Substances, Hazardous

10.3

Substantial Completion

4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

Substantial Completion, Definition of

9.8.1

Substitution of Subcontractors

5.2.3, 5.2.4

Substitution of Architect

2.3.3

Substitutions of Materials

3.4.2, 3.5, 7.3.8

Sub-subcontractor, Definition of

5.1.2

Subsurface Conditions

3.7.4

Successors and Assigns

13.2

Superintendent

3.9, 10.2.6

Supervision and Construction Procedures

1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

Surety

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

Surety, Consent of

9.8.5, 9.10.2, 9.10.3

Surveys

1.1.7, 2.3.4

Suspension by the Owner for Convenience

14.3

Suspension of the Work

3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract

5.4.1.1, 14

Taxes

3.6, 3.8.2.1, 7.3.4.4

Termination by the Contractor

14.1, 15.1.7

Termination by the Owner for Cause

5.4.1.1, **14.2**, 15.1.7

Termination by the Owner for Convenience

14.4

Termination of the Architect

2.3.3

Termination of the Contractor Employment

14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT

14

Tests and Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**

TIME

8

Time, Delays and Extensions of

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1,

9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

Time Limits on Claims

3.7.4, 10.2.8, 15.1.2, 15.1.3

Title to Work

9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK

12

Uncovering of Work

12.1

Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

Unit Prices

7.3.3.2, 9.1.2

Use of Documents

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

Use of Site

3.13, 6.1.1, 6.2.1

Values, Schedule of

9.2, 9.3.1

Waiver of Claims by the Architect

13.3.2

Waiver of Claims by the Contractor

9.10.5, 13.3.2, **15.1.7**

Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**

Waiver of Consequential Damages

14.2.4, 15.1.7

Waiver of Liens

9.3, 9.10.2, 9.10.4

Waivers of Subrogation

6.1.1, **11.3**

Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

Weather Delays

8.3, 15.1.6.2

Work, Definition of

1.1.3

Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

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

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

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

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 Labor and Materials

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

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

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

§ 3.5 Warranty

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

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

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

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

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent

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

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

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

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

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

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

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

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

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely

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

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

§ 3.13 Use of Site

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

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term “Subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term “Subcontractor” does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term “Sub-subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor’s control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor’s right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or

expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during

that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.



SECTION 00-5220 – A201 SUPPLEMENTARY CONDITIONS

1.01 GENERAL CONDITIONS – AIA DOCUMENT A201

The General Conditions of the Contract for Construction of the American Institute of Architects, AIA Document A201, 2007 Edition bound herein and hereinafter referred to as the "AIA General Conditions," and paragraphs of this Section form the General Conditions of the Contract and shall apply to the Contractor and to all Subcontractors. Where any article, paragraph, or sub-paragraph, in the AIA General Conditions is supplemented by one of the following paragraphs, the provisions shall be considered as added thereto. Where any article, paragraph, or sub-paragraph in the AIA General Conditions is amended, voided, or superseded by one of the following paragraphs, the provisions of such article, paragraph, or sub-paragraph, not so amended, shall remain in effect.

A. ARTICLE 1 – CONTRACT DOCUMENTS

1. Section 1.1 – Basic Definitions

Paragraph 1.1.1 – is amended by deleting the last sentence and in its place substituting the following sentence:

"Unless specifically enumerated in the Supplementary Instructions to Bidders, the Contract Documents do not include other documents such as bidding requirements except that in this instance the instructions to bidders do contain specifications and other requirements of the contract and are, therefore, included as Contract Documents."

Paragraph 1.1.1 – Add the following at the end of the paragraph:

"In the event of conflict or discrepancies among the Contract Documents, the document priorities shall be as listed below:

Highest Priority	Change Order
Second	Owner-Contractor Agreement
Third	Addenda – later date to take precedence
Fourth	Supplemental Conditions
Fifth	General Conditions
Sixth	Specifications
Seventh	Drawings

Paragraph 1.1.3 – Add the following at the end of the paragraph:

"The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and include Work, whether or not shown or described, which reasonably may be inferred to be required or

useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the industry."

2. Section 1.2 -Correlation and Intent of the Contract Documents
Paragraph 1.2.2 – At the end of this paragraph add the following:

"The Sections of the Contract Documents are separated for the convenience of reference. Such separations shall not operate to make the Architect an arbiter to establish sub-contract limits between the Contractor and Subcontractors, nor shall they relieve the Contractor of his responsibility to supply and install all the items noted herein and called for in the Contract Documents."

Add the following paragraphs"

"1.2.4 – Errors, conflict, or omissions found in the Contract Documents, after award of the Contract shall be brought to the Architect's attention before any affected work is started for clarification before proceeding with the work. The Architects decision shall be made as stipulated in Article 4, Paragraph 4.2.11".

"1.2.5 – Should the work proceed after the discovery of errors, conflict or omissions by the Contractor and clarification has not been received from the Architect, the Contractor will be held fully responsible for replacement or correction of the affected area as directed by the Architect at the Contractor's expense."

"1.2.6 – "Any discrepancies between the Contract Documents shall be called to the attention of the Architect during bidding or before proceeding with work affected. Upon such notification, the Architect will issue his interpretation to all interested parties at once. The Architect's interpretation shall be final and shall be adhered to by the Contractor at no additional cost to the Owner."

"1.2.7 – Before ordering any material or doing any work, each trade shall verify all measurements at this project and shall be responsible for the corrections of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the drawings; any difference which may be found shall be reported to the Architect for consideration before proceeding with the work."

"1.2.8 – Whenever any item is specified and/or shown on the drawings by detail or reference, it shall be considered typical for other items which are obviously intended to be the same even though not so designated or specifically named but do serve the same function for this project."

1.2.9" – Wherever the terms "necessary," "suitable," "as directed," "satisfactory," "good and sufficient," "approved," or other general qualifying terms are used on the drawings, they are deemed to be followed by the words "in the opinion of the Architect," or "by the Architect," as the case may be.

1.2.10 – The terms "approval," "approved," "approved equal," or "equal," or "other approved" mean approved by the Architect.

B. ARTICLE 2 – OWNER

1. Section 2.1 Definition – Delete paragraph 2.1.2 in its entirety.
2. Section 2.2.1 – Delete paragraph in its entirety and replace with the following
“Contractor acknowledges that Owner is a political subdivision of the Commonwealth of Pennsylvania and as such is empowered to raise revenue for necessary governmental purposes, thereby demonstrating its capability to meet its financial obligations related to the Project.”
2. Section 2.2.3 – Delete paragraph in its entirety and replace with the following
“The Owner shall not be responsible for furnishing surveys or other information as to the physical characteristics of the Project site or utility locations for the Project site. Contractor shall confirm the location of each utility. The Contractor shall have no claims for surface or subsurface conditions, whether unforeseen, foreseen or foreseeable. The Contractor shall exercise special care in executing subsurface work in proximity of subsurface utilities, improvements and easements.”
3. Section 2.2.4 – “Delete the word “Information” at the beginning of the paragraph and replace with “Upon receipt of a written request from the Contractor, Information...”
4. Section 2.4 – Delete in its entirety and replace with the following: “If the Contractor defaults or neglects to carry out the Work in any respect in accordance with the Contract Documents and
fails to commence to correct such default or neglect within 48 hours after written notice thereof from the Architect or the Owner (except such period shall be 7 days if the notice is given after final payment), thereafter fails to use its best

efforts to correct such default or neglect to the satisfaction of the Owner and Architect, or except where an extension of time is granted in writing by the Owner, fails to correct such default or neglect within 30 days of such notice to the satisfaction of the Architect and the Owner, then the Owner may, upon written notice to the Contractor and without prejudice to other remedies the Owner may have, make good such deficiencies. However, if such default or neglect results in a threat to the safety of persons or property, the Contractor shall immediately commence to correct such default or neglect upon receipt of written or oral notice thereof. If the notice is given before final payment, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the costs of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect, or failure and the Owner's administrative and legal expense, including the time of the Owner's personnel in dealing with such default. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.”

6. Add the following new paragraph 2.5: "ADDITIONAL RIGHTS" "Owner's rights set forth in subparagraphs 2.3.1 and 2.4.1 shall be in addition to and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.”

C. ARTICLE 3 – CONTRACTOR

1. Section 3.2 Review of Contract Documents and Field Conditions by Contractor.

Paragraph 3.2.1 – Delete in its entirety and replace with the following “Contractor warrants that it has carefully studied and reviewed the Contract Documents and that it has reported any errors, inconsistencies or omissions to the Architect. The Contractor hereby acknowledges and declares that to its knowledge the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and to fulfill all of its obligations under the Contract Documents. If the Contractor encounters an inconsistency in the construction documents, he shall immediately submit it to the Architect for resolution, said resolution to be based on functional requirements. In addition, if the Contractor performs any construction activity knowing or having reason to know that it involves a recognized error, inconsistency or omission in the Contract Documents, the Contractor shall be responsible for such performance and shall bear the costs for correction.”

2. Delete paragraph 3.2.2 in its entirety.
3. Delete paragraph 3.2.3 in its entirety
4. Section 3.3 – Supervision and Construction Procedures

Add the following new paragraph 3.3.4: “The Contractor shall be responsible to assign a full-time on-site Superintendent to the project. The Owner shall have the right to review any proposed Superintendent’s qualifications and have the right to accept or reject such proposed superintendent. The Owner shall have the right, upon proper notice, to have any superintendent replaced at no additional cost to the Owner.”

5. Add the following new paragraph 3.3.5: “If any of the Work is required to be inspected or approved by any public authority, the Contractor shall cause such inspection or approval to be performed. No inspection performed or failed to be performed shall be a waiver of any of the Contractor's obligations hereunder or be construed as an approval or acceptance of the Work or any part thereof.”

6. Section 3.4 – Labor and Materials

Paragraph 3.4.1 – At the end of this paragraph add the following:

"Wherever any item, device, or part of equipment is referred to in the Contract Documents in singular number, as many items, devices or parts as are required for a complete installation shall be installed."

Add new paragraph: “3.4.4 Directions, specifications and recommendations by manufacturers for installation, handling, storage, adjustment, and operation of their materials or equipment shall be complied with; but the Contractor shall nonetheless have the responsibility for determining whether such directions, specifications, and recommendations may safely and suitably be employed in the work and of notifying the Architect in advance in writing of any deviation or modification necessary for installation safe or proper operation of item.”

Add new paragraph: “3.4.5 The Contractor shall take all necessary steps to ensure labor harmony in the Project. The Contractor shall perform work in accordance with local labor regulations; no extra payment shall be due for doing work under this provision, or for delays or damages for failure to observe such requirements.

Add new paragraph: "3.4.6 The Contractor and Owner shall agree upon a schedule for the progress of the Work (hereinafter "Progress Schedule") within ten (10) days of the Notice to Proceed, which schedule shall designate the commencement date and date of substantial completion for the work. The Progress Schedule shall be binding, time being of the essence.

7. Section 3.5. – Warranty

Paragraph 3.5.1 – delete entire paragraph and substitute as follows:

"In addition to other warranties, guarantees, or obligations set forth in the Contract Documents or applicable as a matter of law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

- .1 The Owner will have good title to the Work and materials and equipment incorporated into the Work will be new.
- .2 The Work and materials and equipment incorporated into the Work will be free from defects, including defects in the workmanship or materials.
- .3 The Work and equipment incorporated into the Work will be fit for the purpose for which they are intended.
- .4 The Work and materials and equipment incorporated into the Work will be merchantable.
- .5 The Work and materials and equipment incorporated into the Work will conform to the Contract Documents."

Add the following new paragraph: 3.5.2 Upon notice of the breach of the foregoing warranties or guarantees or other warranties or guarantees under the Contract Documents, the Contractor, in addition to other requirements in the Contract Documents, will commence to correct such breach and damage resulting therefrom within 48 hours after written notice thereof, thereafter will use its best efforts to correct such breach and damage to the satisfaction of the Owner and, except where an extension of time is granted in writing by the Owner, correct such breach and damage to the satisfaction of the Owner within 30 days of such notice; provided that if such notice is given after final payment hereunder, such 48 hour period shall be extended to 7 days. If the Contractor fails to commence to correct such breach and damage, or correct such breach and damage as provided above, the Owner, upon written notice to the Contractor and without prejudice to its other written notice to the Contractor and without prejudice to his other rights or remedies, may correct the deficiencies. The Contractor upon written notice to the Owner shall pay the Owner, within 10 days after the date of such notice, the Owner's costs and expenses incurred in connection with such correction, including without limitation the Owner's administrative and legal expenses. The foregoing warranties and obligations of the Contractor shall survive the final payment and termination of the Contract.”

8. Section 3.6 Taxes

Add the following paragraphs 3.6.1.1, 3.6.1.2 & 3.6.1.3, and 3.6.2, 3.6.3 & 3.6.4 and 3.6.5 as set forth below:

3.6.1.1 The Owner expects the Contractor to claim tax exemptions for items which are tax exempt.

3.6.1.2 The Owner expects the exemption to be reflected in bids.

3.6.1.3 The Owner will cooperate with the Contractor's obtaining the exemption.

3.6.2 The Contractor shall check all materials, equipment, and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Contract, and the system shall be satisfactory to Owner. Such accounts shall be sufficient to support a request for refund of sales and use tax. The Owner or its representative shall be afforded access to all of the Contractor's records, books, correspondence, instructions, drawings, receipts, vouches, memoranda, and similar data relating to this Contract, and the Contractor shall preserve all such records for a period of 3 years, or for such longer period as may be required by law, after the final payment.

3.6.3 The Contractor agrees to assign and transfer to the Owner all of its rights to sales and use tax which may be refunded as a result of a claim against Owner for refund for materials purchased in connection with this Contract. The Contractor further agrees that it will not file a claim against Owner for refund for any sales or use tax which is subject to this Agreement. The Contractor shall cooperate with and assist the Owner in obtaining any refund of sales and use tax for the Owner's benefit."

3.6.4 The Contractor agrees to include the language of paragraphs 3.6.2 and 3.6.3 (with the word Contractor changed to "Subcontractor") in any contract with Subcontractors.

3.6.5 Section 3.6 - add the following after "similar taxes" - ", including, but not limited to, all applicable taxes levied by Owner pursuant to the Local Tax Enabling Act, 53 P.S. 6924.101 - 6924.901, and all other applicable codes of the Township."

9. Section 3.7. - Permits, Fees and Notices

Paragraph 3.7.1 - delete entire paragraph and substitute as follows:

"3.7.1 The Owner shall pay for, and the Contractors shall secure, the building, mechanical, electrical, fire protection and plumbing permits, water and sewer connections permits, zoning regulation permits, inspections and any other permits required for the project. The Contractor shall secure and pay for all other permits, governmental fees and licenses necessary for proper execution of and completion of the Contract which are legally required when bids are received or negotiations concluded.

Add new paragraph: "3.7.6 – Upon completion of the work and prior to final payment by the Owner, the Contractor shall secure and present to the Owner Certificates of Inspection and approval from the several departments having jurisdiction over his work."

Add new paragraph: "3.7.7 – All fees, charges, and assessments in connection with the above par. 3.7.6 requirements shall be paid by the Contractor. Such fees, charges, and assessments as are specified in separate trade sections of the Specification shall be paid by the respective Sub-contractors."

Add new paragraph: "3.7.8 – Contractor and Sub-contractors must be licensed prior to the start of construction."

10. Section 3.8 – Allowances
Delete paragraphs 3.8.1, 3.8.2 and 3.8.3 in their entirety
11. Section 3.9 – Superintendent
Paragraph 3.9.1 – Add the following sentence between the first and second sentences: "The Contractor shall ensure that the on-site superintendent remains the same employee throughout the entire project with the following exceptions: injury, illness, dismissal, or employee resignation."
12. Section 3.10 – Contractor's Construction Schedules
Subparagraph 3.10.1 – delete entire paragraph and substitute as follows:
"The Contractor shall prepare and submit CPM construction schedules as required by the Contract Documents. The schedules shall not exceed time limits current under the Contract Documents, shall be revised at intervals identified, and related to the entire Project to the extent required by the Contract Documents."
13. Section 3.11 – Supplement as follows:

"3.11.1 – Project Record Documents – Throughout the progress of construction, the Contractor shall keep a set of current, detailed, field record drawings indicating significant deviations from the Contract Drawings, shop drawings, and/or installation drawings, and exact locations of concealed work, including underground utilities. This requirement does not authorize any deviations without approval of the Architect.

.1 The field record information shall be marked in a legible manner on prints of approved shop drawings and/or installation drawings furnished by the

Contractor or, where such drawings do not apply, on prints of the Contract Drawings furnished by the Architect. The filed information to be so marked shall include:

- .a Significant deviations of any nature during construction.
- .b Location of major mechanical and electrical services, utilities, and appurtenances that are concealed in the building, referenced to accessible features of the building.

.2 Upon completion of the work, the field record information marked on prints of approved shop drawings and/or installation drawings together with the marked prints of the Contract Drawings, shall be delivered by the Contractor to the Architect for the Owner."

14. Section 3.13 – Use of Site

Add new paragraph 3.13.1: "The Contractor and subcontractors shall use only specifically assigned areas for storage of materials and construction operations unless other areas are authorized by the Owner. Such areas will be identified after award of Contract by Owner. Comply with local municipal regulations regarding use of and parking on public streets."

Add new paragraph 3.13.2: "The Contractor shall repair streets, drives, curbs, sidewalks, and the existing improvements where disturbed by construction operations and leave them in as good a condition after completion of the work as before operations started."

15. Section 3.14 – Cutting and Patching

Add new paragraph 3.14.3: "A Contractor, subcontractor, or sub-subcontractor requiring the cutting of openings in new work installed by others shall have such openings cut and patched by the trade which installed the work and such cutting and patching shall be at the expense of the Contractor, subcontractor or sub-subcontractor requiring the opening. Approval to do such cutting and patching shall be received from the Architect prior to proceeding with the work and shall include installation of such reinforcement of the work as the Architect may direct. All blocking, bracing, reinforcement, or structural enhancement required due to cutting and patching shall be provided at no additional cost to Owner. All patching work shall match adjacent existing work unless otherwise noted."

16. Section 3.16 – Access to Work

Paragraph 3.16 – is amended by deleting the words “the Owner and Architect” and replace with “at no cost to the Owner, Architect and their agents”.

17. Section 3.18 – Indemnification

Paragraph 3.18.1 – is amended by deleting the words “but only to the extent caused by the negligent acts or omissions” and replace with “caused by acts or omissions”.

D. ARTICLE 4 – ADMINISTRATION OF THE CONTRACT

1. Add new Paragraph 4.3.1

“If the Contractor is delayed at any time in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Architect written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Architect may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the Architect or the Owner, physical damage to the Project over which the Contractor has no control, labor disputes beyond the control of the Contractor, and unusually severe weather conditions not reasonably anticipatable. (Temperature, rain or other precipitation within a range of thirty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions). Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions.”

2. Replace Paragraph 4.2.5 with the following:

“The Architect and Owner’s Representative (if applicable) shall review the Contractor’s Application for Payment, evaluate the physical completion of the Work and make a recommendation to the Owner of the amount to be paid and forward signed Certificates for Payment as prepared by the Contractor as evidence of such recommendation.”

E. ARTICLE 5 – SUBCONTRACTORS

1. Add paragraph 5.3.1 as follows: “Notwithstanding any provision of Subparagraph 5.3.1, any part of the Work performed for the Contractor by a Subcontractor or its sub-subcontractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor (or the Subcontractor and its Sub-subcontractor at any tier), which shall be prepared on a form of subcontract satisfactory to the Owner in all respects. Each such subcontract shall contain provisions that:
 - .1 require that such Work be performed in accordance with the requirements of the Contract Documents;
 - .2 waive all rights the contracting parties may have against one another, or that the Subcontractor may have against the Owner, for damages caused by fire or other perils covered by the insurance described in the Contract Documents;
 - .3 require the Subcontractor to carry and maintain insurance coverage in accordance with the Contract Documents, and to file certificates of such coverage with the Contractor;
 - .4 require the Subcontractor to submit certificates and waivers of liens for work completed by it and by its Sub-subcontractors as a condition to the disbursement of the progress payment next due and owing;
 - .5 require submission to Contractor or Subcontractor, as the case may be, of Applications for Payment in a form approved by the Owner, together with clearly defined invoices and billings supporting all such applications under each subcontract to which the Contractor is a party;
 - .6 report, so far as practicable, unit prices and any other feasible formula for use in the determination of costs of changes in the Work;
 - .7 require each Subcontractor to furnish to the Contractor in a timely fashion all information necessary for the preparation and submission of the reports required herein;
 - .8 require that each Subcontractor continue to perform under its subcontract in the event the Contract is terminated and the Owner shall take an assignment of said subcontract and request such Subcontractor to continue such performance; and

- .9 require each Subcontractor to remove all debris created by its activities.
2. Delete paragraph 5.4.2 in its entirety
3. Reference Section 5.1 – Add Section 5.1.10 as follows: “Require each Subcontractor to provide documentation related to the Contractor’s requirement to provide documents as necessary for any grant and any other grant or loan requirements, if applicable.”

F. ARTICLE 6 – CONSTRUCTION BY OWNER OR SEPARATE CONTRACTOR

1. Paragraph 6.1.1 is amended as follows: Delete the last sentence of the paragraph.
4. Paragraph 6.2.3 is amended as follows: Delete the words “Owner shall be responsible” and replace with “Owner shall not be responsible”.
4. Add paragraph 6.2.6 as follows: “Should the Contractor cause damage to the work or property of any separate contractor, the Contractor shall upon due notice, promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues or initiates dispute resolution proceedings against the Owner, Owner’s Representative and Architect on account of any damage alleged to have been caused by the Contractor, the Owner, Owner’s Representative and Architect shall notify the Contractor who shall defend such proceedings at the Contractor’s expense, and if any judgment or award against the Owner, Owner’s Representative or Architect arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner, Owner’s Representative and Architect for all costs including but not limited to attorneys’ fees, court or mediation or arbitration costs which the Owner, Owner’s Representative or Architect has incurred.”

G. ARTICLE 7 – CHANGES IN THE WORK

1. Section 7.1 – Changes

Add paragraph 7.1.4 as follows:

7.1.4 “Changes in the work shall require the following approvals:

- .1 Changes under \$10,000 shall be approved by the Architect and the Township Manager.
- .2 Changes over \$10,000 shall be approved by the Architect, the Township Manager and the Township Board of Supervisors at their next regularly scheduled public meeting after the Change is submitted, but no sooner than 7 days since the change was submitted. Board approval shall not constitute a claim for delay in the work.

2. Section 7.2 – Change Orders

Add new Paragraph 7.2.2

“The method for determining adjustments to the Contract Sum shall be in accordance with Paragraph 7.3. It will be the Contractor's responsibility to provide complete breakdown of the labor and materials, subcontractor's and sub-subcontractor's cost spent on Change Orders or Construction Change Directives.”

Add new paragraph 7.2.3:

“All changes in the Work shall be approved before the start of any Work through written consent of the Owner in accordance with the procedure above. Changes not approved in writing by the Owner in advance shall not be recognized as a valid claim at a later date, except where the Owner agrees in writing that the change shall be started, subject to an equitable price adjustment at a later date in the interest of the job progress.

The Contractor’s overhead and profit on changes, where allowed, shall be determined as a percentage of actual or estimated cost of such changes, but in no case shall the percentage exceed the following:

Work performed by the Contractor’s own forces: For additions to the Contract Sum, the Contractor may add not more than 10 percent for overhead and profit. For deductions from the Contract Sum, overhead and profit shall not be less than 5 percent.

Work performed by Sub-Contractors to the Contractor: For additions to the Contract Sum, the Sub-Contractor may add not more than 10 percent for overhead and profit and the Contractor may not add more than an additional 5 percent. For deduction from the Contract Sum, overhead and profit shall not be less than 5 percent.

Among items considered as overhead are engineering costs, costs for shop drawing and change order review, salaries of managers, superintendents, technical engineers, timekeepers, clerks and other office personnel, costs of small tools, and home office expenses.

Additionally, it shall be clearly understood and agreed to, that all Change Orders shall include all impact, ripple, or delay costs associated with the execution of that work, and that the Contractor shall not be entitled to any additional compensation or extensions of time due to multiple changes, delays, or causes beyond their control or due to execution of that Work.”

3. Section 7.3 – Construction Change Directives

Paragraph 7.3.3 – Replace Clause 7.3.3.3 with the following:

"The Contractor shall submit to the Owner for review and approval itemized costs of all required labor and material attending changes with separate entries for percentage markups for overhead and for profit. Costs for work performed by Sub-contractors shall be similarly presented to the Owner by the Contractor with the percentage markups for Subcontractor and Contractor separately shown for Owner review and approval, or"

Paragraph 7.3.4.4 delete the entire paragraph and substitute as follows: "Cost of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work will be submitted without mark up."

Add the following paragraphs:

"7.3.11 When the value of an extra Work or change performed by the Contractor is determined on the basis of cost and percentage, the percentage for overhead and profit to the Contractor shall not exceed ten percent of his net cost."

"7.3.12 For Work performed by a Subcontractor, the cost to the Owner may include the net cost to the Subcontractor plus an allowance not to exceed ten percent for the Subcontractor's overhead and profit, plus an allowance not to exceed five percent of the Subcontractor's net cost for the Contractor's overhead and profit."

"7.3.13 Net cost, as used above, may include all items listed in Paragraph 7.3.6, but no percentage for overhead and profit shall be allowed on Social Security and unemployment insurance."

"7.3.14 If deductions are ordered, the credit shall be computed at net cost."

H. ARTICLE 8 – TIME

1. Paragraph 8.3.1 – delete the entire paragraph and substitute with the following:
“If the Contractor is delayed at any time in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Architect written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Architect may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the Architect or the Owner, physical damage to the Project over which the Contractor has no control, labor disputes beyond the control of the Contractor, and unusually severe weather conditions not reasonably anticipatable. (Temperature, rain or other precipitation within a range of thirty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions). Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions.”

3. Paragraph 8.3.3 – delete the entire paragraph and substitute with the following:
“To the fullest extent permitted by law, any extension of time granted pursuant to paragraph 8.3.1 shall be the sole remedy which may be provided by the Owner, and the Contractor shall not be entitled to additional compensation or mitigation of Liquidated Damages for any delay listed in paragraph 8.3.1, including, without limitation, costs of acceleration, consequential damages, loss of efficiency, loss of productivity, lost opportunity costs, impact damages, lost profits or other similar remuneration. The Contractor agrees that the possibility that the Contractor may accelerate performance of the Work to meet the Construction Schedule is within the contemplation of the parties and that such acceleration is solely with the discretion of the Contractor.

I. ARTICLE 9 – PAYMENTS AND COMPLETION

1. Section 9.3 Application for Payment

Paragraph 9.3.1 – add the following sentence: "The form of Application for Payment shall be a notarized AIA Document G702, Application and Certificate for Payment, supported by AIA Document G703, Continuation Sheet.

Add new paragraph 9.3.1.3

“Contractors shall submit with each monthly Application for Payment 1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous Application was submitted and the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, and 2) release or waivers of liens arising out of the Contract from each Subcontractor, materialmen, supplier, and laborer of the Contractor.”

Paragraph 9.3.2 – is deleted in its entirety and is replaced by the following:

"Payments shall be made on account of materials and equipment only after the materials and equipment have been incorporated into the Work. Township may elect to pay for 75% of the value of stored materials when the Contractor provides invoices for materials, photos of materials, proof of insurance for materials and consent of surety for the storage location."

Paragraph 9.3.3 – delete the entire second sentence with the following language:

"The Contractor further warrants that upon submittal of an Application for Payment all work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the work."

Add new paragraph 9.3.4

“The Contractor warrants and certifies with the submission of each Application for Payment that Contractor has or will supply the Owner, through the Architect, Wage Certifications that comply with the Secretary of Labor and Industry's requirements. The Contractor shall further certify that all Wage Certifications have been received from all subcontractors. Failure to submit Wage Certifications will be deemed to be reason to withhold all or part of the amount covered by an Application for Payment and shall be a default under the Contract.”

Add new paragraph 9.3.5

“Partial or full payment to the Contractor(s) for material, equipment, or work in place shall not start the warranty period specified in the Contract Documents.”

2. Section 9.4 Certificates for Payment

Add the following new paragraph:

"9.4.3 Not more than once each month, payments shall be made by the Owner as follows:

The Contractor shall be paid 90% of the earned sum when payment is due, 10% being retained to assure faithful performance of the Contract. After 50% completion has been accomplished, one-half (1/2) of the amount retained by the contracting body (i.e. the 10% retainage) shall be returned to the Contractor. Thereafter, retainage shall not exceed 5% of the value of the completed work based on monthly progress payment requests in accordance with 62 Pa.C.S. §3921 et seq. Provided, however, that the Architect determines that satisfactory progress is being made in the work and all other conditions of the aforesaid Act are met.

Following substantial completion, as defined herein, there shall be due the Contractor a payment equal to the difference between all previous payments and ninety-eight percent of the value of labor and materials of the Contract amount. Final payments shall be made within thirty days after completion and acceptance by the Architect of all Work included in the Contract.

The date of substantial completion shall be determined by certification."

3. Section 9.5 – Decisions to Withhold Certification

Paragraph 9.5.1 – modify as follows

Delete Clauses .1 through .7 and replace with the following:

.1 The Contractor is in default of the performance of any of its obligations under the Contract Documents, including, but not limited to: failure to provide sufficient skilled workers; work, including equipment or materials, which is defective or otherwise does not conform to the Contract Documents; failure to conform to the Project Time Schedule; or failure to follow the directions of or instructions from the Architect or Owner.

.2 The filing of third party claims or liens or reasonable evidence that third party claims or liens have been or will be filed.

.3 The Work has not proceeded to the extent set forth in the Application for Payment.

.4 Representations made by the Contractor are untrue.

.5 The failure of the Contractor to make payments to its Subcontractors, materialmen, or laborers.

.6 Damage to the Owner's property or the property of another Contractor or person.

.7 The determination by the Architect that there is a substantial possibility that the Work cannot be completed for the unpaid balance of the Contract Sum.

Add the following new paragraph: 9.5.4

"If the Architect withholds certification of an Application for Payment in whole or in part, the Contractor may assert a claim for any amount in dispute. The Contractor may not stop or delay work or terminate the Contract because the Architect withholds certification for an Application for Payment in whole or in part."

4. Section 9.6 – Progress Payments

Paragraph 9.6.2 – is supplemented by addition of the following paragraphs:

"The Contractors shall pay their sub-contractors 90% of their earned sums when payments are due, 10% being retained to assure faithful performance of their contracts.

The Owner will furnish to any Subcontractor, upon request, information on the amount of work certified to the Contractor relating to the subcontractor's work. Final payment shall be made by the Contractors to each subcontractor 30 days after receipt of payment from the Owner on account of 100% completion of such subcontractor's contract."

Add the following new paragraph: 9.6.2.1

"The Contractor shall comply with Act No. 1994-7 of the Pennsylvania General Assembly, which provides, in part, the following:

Section 7. (c) Contractor' and subcontractors payment obligations

When a subcontractor has performed in accordance with the provisions of the contract, a contractor shall pay to the subcontractor, and each subcontractor shall in turn pay to the subcontractor's subcontractors, the full or proportional amount received for each such subcontractor's work and materials, based on work completed or service provided under the subcontract, 14 days after receipt

of each progress or final payment or 14 days after receipt of the subcontractor's invoice, whichever is later.

5. Section 9.7 – Failure of Payment

Paragraph 9.7.1 is supplemented by the addition of the following:

"The Contractor shall not stop Work or terminate the Contract if the Architect should refuse to issue any certificate because the application for payment does not conform with requirements of Paragraphs 9.3, 9.4, and 9.5 of the General Conditions."

Add the following new paragraph: 9.7.2

"The Contractor shall not stop Work or terminate the Contract if the Architect should refuse to issue any certificate because the Application for Payment does not conform with requirements of Paragraphs 9.3, 9.4, 9.5 and 9.6 of the General and/or Supplementary Conditions."

6. Section 9.8 – Substantial Completion

Paragraph 9.8.1 – is deleted in its entirety and is replaced by the following:

"Substantial Completion of the Project shall be deemed to occur when the Architect determines that the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents and when all required occupancy permits have been issued so the Owner can occupy or utilize the Work for its intended use and, in addition, all requirements of the Contract Documents for Substantial Completion, including the following conditions, have been fulfilled as follows:

9.8.1.1 The Contractor has delivered an accurate and complete set of as built drawings, record specifications, record product data, record samples and maintenance manuals to the Architect;

9.8.1.2 The Contractor has delivered to the Architect all written warranties and related documents required by the Contract Documents; and

9.8.1.3 The cost to complete the work, as reasonably determined by the Architect, is one-half percent (½%) or less of the Contract Sum.

Add the following new paragraph: 9.8.6

"It is the Contractor's responsibility to prepare and complete their own comprehensive lists (punch-lists) in order to submit for Substantial Completion. If after the list is submitted and upon inspection, it is found to be incomplete, lengthy or ill prepared, the Substantial Completion request will be denied. If it is

required, because of the Contractor's inability to complete their punch list and, therefore, complete the Contract, that the Architect, or any of its Architects or representatives, is required to prepare punch lists, then according to 12.2.1, the Contractor will be responsible for such costs. The Architect will be compensated for such additional work at standard prevailing rates by the Owner, only if the Owner agrees in writing to the amount to be paid to the Architect prior to any additional work being performed. The Owner will duly back-charge the Contractor for such additional costs and deduct such costs from retainage or Application for Payment. If the cost due the Architect as a result of Contractor's actions or inactions exceed the amount payable, the Contractor will be responsible to pay Owner for any overage.

7. Section 9.9 – Partial Occupancy or Use

Paragraph 9.9.1 – At the end of this Paragraph add the following:

"The Owner shall have the right, at any time during the construction of the facility, to enter the structure for the purpose of performing any necessary work, or for any other purpose in connection with the installation of facilities; it is being mutually understood and agreed, however, that the Contractor and the Owner will labor to mutual advantage where their several works in the above-mentioned or unforeseen instances touch upon or interfere with each other."

8. Section 9.10 – Final Completion and Final Payment

Paragraph 9.10.2 – is amended by the deletion of the final sentence in its entirety reading as follow:

"If a subcontractor refuses to furnish a release or waiver required by the owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees."

Paragraph 9.10.4 – is amended by the following:

Add the following additional Clauses:

.5 Claims for Indemnification;

.6 Claims about which the Owner has given the Contractor written notice;

.7 Claims arising after final payment.

9. Add the following new paragraph – 9.11 Liquidated Damages

9.11.1 Actual damages for delay in the time of completion are impossible to accurately determine. The Contractor and the Contractor's surety shall be liable for and shall pay the Owner the sums herein stipulated as Liquidated Damages for failure to substantially complete the work within the time limits indicated in the Contract Documents and for failure to complete the Work in accordance with the Project Milestones. By submitting its bid, the Contractor asserts and agrees that the periods set forth for performing the Work are reasonable and that the Contractor's work can be substantially complete by the respective dates for the Project Milestones as well as for Substantial Completion.

9.11.2 The Owner shall have the right to deduct the total amount of any liquidated damages for which the Contractor may be liable from any monies otherwise due to the Contractor under the Contract, including any retainage held by the Owner.

9.11.3 By submitting the Bid, the Bidder agrees that the periods for performing the Work are reasonable, and that the Bidder's Work can be substantially complete by the respective Dates for Substantial Completion.

J. ARTICLE 10 – PROTECTION OF PERSONS AND PROPERTY

1. Add the following Paragraph 10.2.8:

"10.2.8 The Contractor shall protect and maintain in operation all pipe lines, conduits, sewers, drains, poles, wiring and the like that in any way interfere with the work, whether or not they are specifically shown on the drawings. The Contractor shall see that all items to be abandoned are abandoned in a proper manner and that other items are protected, supported and/or moved as necessary to accommodate the new work."

2. Delete 10.3.3 in its entirety.

3. Paragraph 10.4 – Supplement as follows:

"The Contractor shall furnish the Owner a typewritten list of the names, addresses and telephone numbers of members of his organization to be contacted in the event of emergency at the construction site. The list shall be prepared under the Contractor's letterhead and shall designate the responsible parties to be contacted during no-work hours at the site."

K. ARTICLE 11 – INSURANCE AND BONDS

Delete 11.1, 11.2, 11.3 and 11.4 in their entirety and substitute the following:

11.1 – General Insurance Requirements

11.1.1 – The Contractor shall not commence Work until the Contractor has obtained at the Contractor's own expense all of the insurance as required hereunder and such insurance has been approved by the Owner; nor shall the Contractor allow any Subcontractor to commence work on any subcontract until all insurance required of the Subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Owner of original certificates of insurance signed by authorized representatives of the insurers or, at the Owner's request, certified copies of the required insurance policies.

11.1.2 – Insurance as required hereunder shall be in force throughout the term of the Contract and for two years after final acceptance of the Project by Owner in accordance with 11.3.1.1.iv. Original certificates signed by authorized representatives of the insurers or, at the Owner's request, certified copies of insurance policies, evidencing that the required insurance is in effect, shall be maintained with the Owner throughout the term of the Contract and for two years after final acceptance of the Project by Owner.

11.1.3 – The Contractor shall require all Subcontractors to maintain during the term of the Contract commercial general liability insurance, business auto liability insurance, and workers compensation and employers liability insurance and umbrella excess or excess liability insurance to the same extent required of the Contractor in 11.3.1.1, 11.3.1.2 and 11.3.1.3 and 11.3.1.4 unless any such requirement is expressly waived or amended by the Owner in writing. The Contractor shall furnish Subcontractors' certificates of insurance to the Owner immediately upon request.

11.1.4 – All insurance policies required hereunder shall be endorsed to provide that the policy is not subject to cancellation or non-renewal until sixty (60) days prior written notice has been given to the Owner.

11.1.5 – No acceptance and/or approval of any insurance by the Owner shall be construed as relieving or excusing the Contractor or the Contractor's Surety from any liability or obligation imposed upon either or both of them by the provisions of this Contract.

11.1.6 – If the Contractor does not meet the insurance requirements of this Contract, the Contractor shall forward a written request to the Owner for a waiver in writing of the insurance requirement(s) not met or approval in writing of alternate insurance coverage, self-insurance,

or group self-insurance arrangements. If the Owner denies the request, the Contractor must comply with the insurance requirements as specified in this Contract.

11.1.7 – All required insurance coverages must be underwritten by insurers authorized to do business in the Commonwealth of Pennsylvania and acceptable to the Owner. The insurers must also have a policyholders' rating of "A-" or better, and a financial size of "Class VII" or better in the latest evaluation by A. M. Best Company, unless Owner grants specific approval for an exception. The Owner hereby grants specific approval for the acquisition of workers compensation and employers liability insurance from the State Workers' Insurance Fund (SWIF) of Pennsylvania.

11.1.8 – Any deductibles or retentions in excess of \$10,000 shall be disclosed by the Contractor, and are subject to Owner's written approval. Any deductible or retention amounts elected by the Contractor or imposed by the Contractor's insurer(s) shall be the sole responsibility of the Contractor.

11.1.9 – Any and all return premiums and/or dividends for insurance or coverage directly charged to the Owner by the Contractor in connection with this Contract shall belong to and be payable to the Owner.

11.1.10 – If the Owner is damaged by the failure or neglect of the Contractor to purchase and maintain insurance as described and required herein, without so notifying the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

11.2 – Owner's Liability Insurance

11.2.1 – The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance, or solely at the Owner's option, the Owner may self-insure the Owner's liability exposures.

11.3 – Contractor's Liability Insurance

11.3.1 – The Contractor shall purchase and maintain the following insurance coverages which will insure against claims which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Insurance shall be written for not less than the limits specified below or required by law, whichever is greater.

11.3.1.1 – Commercial general liability insurance or its equivalent for bodily injury, personal injury and property damage including loss of use, with minimum limits of:

- \$ 1,000,000 each occurrence;
- \$ 1,000,000 personal and advertising injury;
- \$ 2,000,000 general aggregate; and
- \$ 2,000,000 products/completed operations aggregate.

This insurance shall include coverage for all of the following:

- i. General aggregate limit applying on a per project basis;
- ii. Liability arising from premises and operations;
- iii. Liability arising from the actions of independent contractors;
- iv. Liability arising from products and completed operations with such coverage to be maintained for two years after completion of the Work;
- v. Contractual liability including protection for the Contractor from bodily injury and property damage claims arising out of liability assumed under this Contract; and
- vi. Liability arising from the explosion, collapse, or underground (XCU) hazards.

11.3.1.2 – Business auto liability insurance or its equivalent with a minimum limit of \$1,000,000 per accident and including coverage for all of the following:

- i. Liability arising out of the ownership, maintenance or use of any auto; and
- ii. Automobile contractual liability.

11.3.1.3 – Workers compensation insurance or its equivalent with statutory benefits as required by any state or Federal law, including standard "other states" coverage; employers liability insurance or its equivalent with minimum limits of:

- \$ 100,000 each accident for bodily injury by accident;
- \$ 100,000 each employee for bodily injury by disease; and
- \$ 500,000 policy limit for bodily injury by disease.

11.3.1.4 – Umbrella excess liability or excess liability insurance or its equivalent with minimum limits of:

- \$ 5,000,000 per occurrence;
- \$ 5,000,000 aggregate for other than products/completed operations and auto liability; and
- \$ 5,000,000 products/completed operations aggregate

and including all of the following coverages on the applicable schedule of underlying insurance:

- i. Commercial general liability;
- ii. Business auto liability; and
- iii. Employers liability.

11.3.1.5 – Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be named as additional insureds on the Contractor's commercial general liability insurance and umbrella excess or excess liability insurance policies with respect to liability arising out of the Contractor's work under this Contract. Such coverage shall extend to cover the additional insured(s) for liability arising out of the following:

- i. On-going operations; and
- ii. Completed operations.

The commercial general liability policy and the umbrella excess liability or excess liability policies, if required herein, must include additional insured language, which shall afford liability coverage for the exposures listed above in i. and ii.

Special Note: Policies endorsed with the following combinations of ISO forms shall be acceptable:

- CG 2010 entitled “Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization” and CG 2037 entitled “Additional Insured – Owners, Lessees or Contractors – Completed Operations”;

OR

- CG 2033 entitled “Additional Insured – Owners, Lessees or Contractors – Automatic Status When Required in Construction Agreement With You” and CG 2037 entitled “Additional Insured – Owners, Lessees or Contractors – Completed Operations”.

Both endorsements are required to afford coverage to the additional insured for both on-going operations and completed operations. Additionally, the schedules on these endorsements must properly reference the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees.

11.3.1.6 – Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees under any Contractor's liability insurance or self-insurance required herein, including, but not

limited to, umbrella and excess liability or excess liability policies, shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of insurance or self-insurance. (Any cross suits or cross liability exclusion shall be deleted from Contractor's liability insurance policies required herein.)

11.3.1.7 – Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein shall be primary, and any other insurance, self-insurance, coverage or indemnity available to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be excess of and non-contributory with insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein.

11.3.2 – If any liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor must comply with the following additional conditions:

- i. The Contractor shall agree to provide certificates of insurance evidencing the above coverages for a period of two years after final payment for the Contract. Such certificates shall evidence a retroactive date no later than the beginning of the Work under this Contract; or
- ii. The Contractor shall purchase an extended (minimum two years) reporting period endorsement for each such "claims made" policy in force as of the date of final acceptance and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself. Such certificate or copy of the endorsement shall evidence a retroactive date no later than the beginning of the Work under this Contract.

11.4 – Builders Risk Insurance

11.4.1 – The Owner shall purchase and maintain builders risk insurance on a replacement cost basis with a limit at least equal to the initial Contract Sum. This insurance shall be maintained until final acceptance of the Project by the Owner or until no person or entity other than the Owner has an insurable interest in the covered property, whichever is earlier. This builders risk insurance shall include the interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Project.

11.4.2 – Insurance shall be on an "all-risk" or equivalent policy form and shall insure against the perils of fire, extended coverage, theft, vandalism, malicious mischief, collapse and

windstorm. Coverage is to apply for debris removal including demolition occasioned by a covered loss. This insurance shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such covered loss. Coverage for other perils such as flood and earthquake or for loss caused by the enforcement of any applicable ordinance or law shall not be required unless otherwise provided in the Contract.

11.4.3 – This builders risk insurance shall cover all of the following types of property:

- i. All structures to be constructed, under construction, and/or already constructed which are part of the Project;
- ii. All materials, equipment, machinery and supplies which are to be incorporated into the Project;
- iii. Temporary structures of any nature whatsoever; and
- iv. Underground property, including but not limited to, foundations, pump stations, pumps, pipes, drains, tanks and connections.

11.4.4 – The Contractor shall be responsible for payment of any deductibles applicable under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Project.

11.4.5 – Unless otherwise provided in the Contract Documents, this builders risk insurance shall cover materials to be incorporated into the Project which are off the site, and also such materials in transit.

11.4.6 – This builders risk insurance shall insure (or shall be amended to insure) against loss or damage caused by the boiler and machinery perils with limits and scope of coverage that are deemed by the Owner to be satisfactory. This insurance shall also include the interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Project.

11.4.7 – The Owner and Contractor waive all rights against each other and against the Owner's other Contractors and own forces described in Article 6, if any, and the subcontractors, sub-subcontractors, (elected and appointed officials, officers, directors, trustees, agents, employees and consultants) of any of them, for property damage to or loss of use of the Work to the extent that such property damage or loss of use is covered by this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Work. The policies shall provide such waivers of subrogation by endorsement or otherwise.

11.4.8 – Any loss covered under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Work shall be payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to any mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.4.9 – Owner, as fiduciary, shall have the power to adjust and settle a loss with insurers.

11.4.10 – Partial occupancy or use in accordance with the provisions of the Contract that pertain to partial occupancy or use shall not commence until the builders risk insurer has granted permission by endorsement or otherwise for the Owner to partially occupy or use any completed or partially completed portion of the Work at any stage of construction. The Owner and Contractor shall take reasonable steps to obtain such permission.

11.4.11 – The insurance required by this Paragraph 11.4 is not intended to cover machinery, tools or equipment owned or rented by the Contractor, or its Subcontractors, which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor and its Subcontractors shall, at their own expense, purchase and maintain property insurance coverage for owned, leased or rented machinery, tools or equipment. The Contractor, and its Subcontractors, hereby waive all rights against the Owner and its elected and appointed officials, officers, agents, employees and consultants for property damage to or loss of use of such machinery, tools or equipment to the extent that such property damage or loss of use is covered by the Contractor's or Subcontractor's property or equipment floater insurance or other similar property insurance maintained by the Contractor or its Subcontractors. The policies shall provide such waivers of subrogation by endorsement or otherwise.

L. ARTICLE 12 – UNCOVERING AND CORRECTION OF WORK

1. Paragraph 12.2.1. is deleted in its entirety and is replaced by the following:
“Within 48 hours after written notice from the Architect or the Owner (except such period shall be 7 days when notice is given after final payment) that the work does not conform to the Contract Documents, or immediately upon oral notice, if the nonconformance constitutes a threat to the safety of persons or property, the Contractor, without waiting for the resolution of disputes that may exist, shall commence to correct such nonconformance, shall thereafter use its best efforts to correct such nonconformance to the satisfaction of the Architect and the Owner, and except where an extension of time is granted in writing by the Owner, shall complete necessary corrections so that the nonconformance is eliminated to the satisfaction of the Architect and the Owner within 30 days of such notice. The Contractor shall bear the costs of correcting the nonconformance, including additional testing and inspections and additional service fees of the Architect. The notice provided for in this Subparagraph 12.2.1 may be given at any time. It is the intent that the obligations under this Subparagraph 12.2.1 shall continue to apply after final completion and final payment.”

Add the following new paragraph: 12.2.1..2

“Work that is rejected or fails to conform to the requirements of the Contract Documents, that requires any review, research, recommendation, meetings or direction by the Architect or any of his Consultants in order to substantiate same or to approve remedies or alternate solution will be subject to Paragraph 12.1.1. The Architect will be compensated for such additional work at standard prevailing rates as provided to the Owner from the Architect. The Owner will duly back-charge the Contractor for such additional costs and deduct costs from retainage or Application for Payment.”

Add the following new paragraph: 12..2.1.3

“Nothing contained in Paragraph 12.2 shall decrease the responsibility set forth in the "Performance Bond".

M. ARTICLE 13 – MISCELLANEOUS PROVISIONS

1. Article 13 is supplemented by the addition of the following sections:

.1 "13.6 ASBESTOS CONTAINING MATERIALS – All Contractors shall certify that no 'asbestos containing materials' (a.c.b.m.) have been used in any phase of this installation.

13.6.1 If at any time in the future it is discovered that there are any "asbestos containing materials" (a.c.m.) or any "asbestos containing building materials" (a.c.b.m.) in this installation, the Contractor will be exclusively responsible for all costs related to the removal of this material. This material will be removed by the designee of the Owner in accordance with the guidelines of the Asbestos Hazard Emergency Response Act of 1987 (P.L. 99–519)."

.2 13.7 STEEL PRODUCTS PROCUREMENT ACT

13.7.1 Except where the Owner determines by resolution and in writing that steel products are not produced in the United States in sufficient quantities to meet the requirements of the contract, all steel products used or supplied by the Contractor or any Subcontractor in the construction, reconstruction, alteration, repair, improvement or maintenance of public works under this contract shall have been processed from steel made in the United States by open hearth, basic oxygen, electric furnaces, Bessemer or other steel making processes. Likewise, cast iron products shall have been similarly processed. When

unidentified steel products are supplied under this, the Contractor must provide documentation including, but not limited to invoices, bills of lading, and mill certification that the steel was melted and manufactured in the United States. If a steel product is identifiable from its face, the contractor must submit certification satisfactory to the Owner that it has fully complied with the provisions of the Pennsylvania Steel Products Procurement Act (73 P.S.-1881), the Act of March 3, 1978 (P.L. 6, No. 3) as amended. The Contractor shall include these requirements in all contracts with Subcontractors.

.3 13.8 RECIPROCAL LIMITATIONS ACT, Act 146 of 1986.

13.8.1 Except where the Owner determines by resolution and in writing contrary to the Act, the Contractor shall abide by this Act that prohibits the use of supplies, equipment or materials manufactured in a state or territory which discriminates against the purchase of such supplies, equipment or materials manufactured in the Commonwealth of Pennsylvania in said state or territory's public buildings and other works.

.4 13.9 TRADE PRACTICES ACT of July 23, 1968, P.L. 686.

13.9.1 Except where the Owner determines by resolution and in writing contrary to the Act, the Contractor shall abide by this Act that prohibits the use of aluminum or steel products made in a foreign country that discriminates against such products manufactured in the Commonwealth of Pennsylvania.

.5 13.10 ANTI-BID RIGGING ACT of October 28, 1983, P.L. 176.

13.10.1 Except where the Owner determines by resolution and in writing contrary to the Act, the Contractor shall abide by this Act that which requires non-collusion affidavits.

.6 13.11 PENNSYLVANIA HUMAN RELATIONS ACT of 1955, P.L. 744, No. 222, as amended.

13.11.1 Except where the Owner determines by resolution and in writing contrary to the Act, the Contractor shall abide by this Act that prohibits any bidder from discriminating against any employee, applicant for employment, contractor or any other person because of race, color, religious creed, ancestry, national origin, age or sex.

.7 13.12 THE AMERICANS WITH DISABILITIES ACT (Public Law 101-336).

13.12.1 Contractor shall comply with the latest edition of this Act.

8 13.13 Public Works Employment Verification Act” (Act 127 of 2012, 43 P.S. §167.1, *et seq.*) Use the State forms for verification.

N. ARTICLE 14 – TERMINATION OR SUSPENSION OF THE CONTRACT

1. Delete paragraph 14.1.1 in its entirety and substitute as follows
“Events of Default; except in the event of the failure to pay the Contractor which will be subject to the terms of the General Conditions and Supplementary Conditions of the Contract, the following constitutes the exclusive event of default of the Owner:

.1 The failure of the Owner to perform its obligations under the Contract Documents and to correct such failure within 90 days after written notice thereof from the Contractor.”

Delete paragraph 14.1.2 in its entirety and substitute as follows

“Contractor's Remedies; upon the occurrence of an event of default by the Owner, unless the Owner admits in writing that it is in default, except as expressly provided in the General Conditions or the Supplementary Conditions of the Contract, the Contractor's sole and exclusive remedy will be to submit the dispute to the Architect for its decision under Paragraphs 4.2.11 through 4.2.14 of the General and Supplementary Conditions of the Contract for the Project. If the Owner admits in writing that it is in default, then the Contractor will be entitled to remedies as set forth in this Agreement.”

Delete paragraphs 14.2.1, 14.2.2, and 14.2.3 in their entirety and substitute as follows

- 14.2.1 Events of Default; each of the following constitutes an event of default of the Contractor:

.1 The failure of the Contractor to perform its obligation under the Contract Documents or under the Contract Documents pertaining to other agreement which the Contractor may have with the Owner and to proceed to commence to correct such failure within 48 hours after written notice thereof from the Owner or the Architect or such lesser time as is provided in the Contract Documents, or thereafter to use its best efforts to correct such failure to the satisfaction of the Owner, or, except where an extension of time is granted in writing by the Owner, to correct such failure within 30 consecutive days after written notice thereof.

.2 The failure of the Contractor to pay its obligations as they become due, or the insolvency of the Contractor.

14.2.2 Owner's Remedies; upon the occurrence of an event of default the Owner will have the following remedies, which will be cumulative:

.1 To order the Contractor to stop the Work or part of it, in which case the Contractor will do so immediately;

.2 To perform through others all or part of the Work remaining to be done and to deduct the cost thereof from the unpaid balance of the Contract Price;

.3 To terminate this Agreement and take possession, for the purpose of completing the Work or part of it, materials, equipment, scaffolds, tools, appliances, and other items belonging to or possessed by the Contractor, of which the Contractor hereby transfers and assigns to the Owner for such purpose, and to employ a person or persons to complete the Work, including the Contractor's employees, and the Contractor will not be entitled to receive further payment until the Work is completed;

.4 Other remedies which the Owner may have at law or in equity or otherwise under the Contract Documents.

14.2.3 Payments Due Contractor: If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation of the Architect's additional services and costs, expenses or damages incurred by the Owner as a result of the event of default, including attorney's fees and the administrative expense of the Owner's staff, such excess will be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor will pay the difference to the Owner. The amounts to be paid by the Owner or the Contractor will be certified by the Architect, and such certification will be the final determination of the

amount owed, except for sums coming due thereafter. The obligations under this Subparagraph will survive the termination of this Agreement.

Add the following new paragraph: 14.2.5

Notwithstanding the above, the contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the contractor and the Owner may withhold any payments to the contractor for the purpose of compensation until such time as the exact amount of the damage due the Owner from the contractor is determined.

Add the following new paragraph: 14.2.6

In case of default by the successful bidder, the Owner may procure the articles or services from other sources and hold the successful bidder responsible for any excess cost occasioned thereby.

Add the following new paragraph: 14.4.4

"If the Contract is terminated without cause and for the Owner's convenience and there exists an event of the Contractor's default, as defined in Paragraph 14.2 of these Supplementary Conditions, the Contractor will be entitled to receive only such sums as it would be entitled to receive following the occurrence of an event of default under the Owner/Contractor Agreement."

Add the following new paragraph: 14.4.5

"The termination of the Contract shall be with or without prejudice to rights or remedies which exist at the time of termination."

Paragraph 14.4 is amended as follows:

Add the following sentence at the end of Paragraph 14.4: A reasonable allowance for overhead and profit shall be provided, but in no case greater than ten percent (10%)."

O. ARTICLE 15 – CLAIMS AND DISPUTES

1. Delete Section 15.3 MEDIATION in its entirety
2. Section 15.4 ARBITRATION – delete in its entirety and replace with the following

15.4.1 Controversies and Claims Subject to Dispute Resolution. Any controversy or claim, except those relating to aesthetic effect, shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be

resolved by mediation or arbitration if all parties agree to mediation or arbitration thereof. In the absence of such agreement, any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be settled by trial in the Chester County, Pennsylvania, Court of Common Pleas. All parties hereby consent to such jurisdiction and venue.

15.4.2 A demand for dispute resolution of a claim shall be made within the time limits specified in Subparagraphs 4.4.6 and 4.6.1 as applicable, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

15.4.3 Contract Performance During Dispute Resolution. During dispute resolution proceedings the Owner and Contractor shall comply with Subparagraph 4.3.3.

15.4.4 Claims and Timely Assertion of Claims. The party filing a notice of demand for dispute resolution must assert in the demand all Claims then known to that party on which dispute resolution is permitted to be demanded.

15.4.5 Mediation shall be conducted by a mediator whom shall be appointed and agreed to by both the Owner and Contractor. Arbitration shall be conducted by a panel of three arbitrators, one of whom shall be appointed by the Owner, one of whom shall be appointed by the Contractor, and one of whom shall be appointed by agreement of the Owner and the Contractor. The mediation or arbitration proceedings shall be conducted in the County wherein the project that is the subject of these Contract Documents is located, unless otherwise mutually agreed to by the Owner and the Contractor.

P. ARTICLE 16 – CONTRACTORS OBLIGATIONS

1. Article 16 is added as follows:

Add paragraphs 16.1 and 16.2 as set forth below:

16.1 The Contractors must assume all risks and bear any loss occasioned by neglect or accident during the progress of the Work until the Work shall have been completed and accepted by the Owner. The Contractor agrees to indemnify, defend and save harmless the Owner and Architect from all suits and claims for damages, loss or injury to persons or property received or sustained from the Contractor or his agents in the performance of the Work under his contract. The Contractor must properly protect all adjacent Work during the progress of construction and make

good all damage that may occur to any work herein specified or to adjacent property in consequence of the Work herein specified. He must also assume all blame or loss by reason of neglect or violation of local or state laws, ordinances and regulations, encroachments upon neighbors, or from any other cause.

16.2 The Work in every respect shall be under the care of the Contractor and at his risk, he shall properly safeguard against any or all injury or damage to the public, to any property, materials, or thing, except where stipulated otherwise in the specifications, and also be responsible for any such damage or injury from his undertaking of this work to any person or persons or thing connected therewith. He shall indemnify and save harmless the Owner and Architect from all claims, suits, damages, actions of law, in equity or otherwise, (including the cost of defense thereof which shall be assumed by the Contractor) or any kind whatsoever in connection with this work and agreement and shall, if required, show evidence of settlement of any such action before final payment is made hereunder by the Owner.

END OF SECTION 00-5220

SECTION 00-5230 – TIME FOR COMPLETION

PART 1 – GENERAL

1.1 COMPLETION

- A. It is hereby understood and mutually agreed by and between the Contractors and Owner that the date of beginning and the time for completion as specified in the Contract of work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the Notice to Proceed.
- B. The Contractors agree that said work shall be prosecuted regularly, diligently and without interruption at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed by and between the Contractors and Owner that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- C. It is further agreed that time is of the essence for each and every portion of this Contract and for the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work. A request for an extension of time shall be submitted to the Architect in writing. If approved, a Change Order will be issued to reflect the specific amount of time that the contract will be extended. The new time limit fixed by such extension shall be of the essence of this contract; Provided, Owner determines that (1) the Contractor is without fault and (2) the Contractor's reasons for the time extension are acceptable to Owner or (3) the delay in the work is due:
1. To any preference, priority or allocation order duly issued by the United States Government;
 2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to acts of God or the public enemy, acts of the Owner, acts of another Contractor in the performance of contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather; or
 3. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections (1) and (2) of this article; Provided further, that the Contractor shall within ten (10) days from the beginning of such delay, unless Owner shall grant a further period of time prior to the date of final settlement of the contract, notify Owner in writing of the cause of delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.
- D. Owner reserves the right to withhold payments due under the Contract if the work of the Contractor is significantly behind the CPM schedule agreed upon by the each Contractor.

Any such payments so withheld shall be promptly paid to the Contractor when the work is substantially back on schedule.

END OF SECTION 00-5230

SECTION 00-5240 - LIQUIDATED DAMAGES

PART 1 - GENERAL

1.1 PROJECT SITE

The Project is: West Bradford Township Municipal Building

located at: 1385 Campus Drive

<u>Downingtown</u>	<u>Chester</u>	<u>Pennsylvania</u>
(City)	(County)	(State)

as shown on the West Bradford Township Municipal Building drawings and written specifications.

Drawing(s) No.(s) as indicated on the Cover Sheet of the Contract Documents

1.2 DATE FOR COMPLETION

A. The work which the Contractor is required to perform under this Contract shall be commenced at the time stipulated by West Bradford Township in the Notice to Proceed to the Contractors and shall be substantially completed within the calendar days thereafter, noted below

Administration and Police Building and related site work substantially complete and completely ready for Owner occupancy: **360 calendar days after Notice to Proceed**

1.3 LIQUIDATED DAMAGES

A. As actual damages for any delay in completion of the work which the Contractor is required to perform under this contract are impossible of determination, the Contractor and his Sureties shall be liable for and shall pay to West Bradford Township the sum of One Thousand Five Hundred Dollars (\$1,500) as fixed, agreed

and liquidated damages for each calendar day of delay from the above stipulated for completion, or as modified in accordance with Section A201, General Conditions thereof, until such work is satisfactorily completed and accepted.

END OF SECTION 00-5240

DRAFT AIA® Document A305™ – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO: « »

ADDRESS: « »

SUBMITTED BY: « »

NAME: « »

ADDRESS: « »

PRINCIPAL OFFICE: « »

[« »] Corporation

[« »] Partnership

[« »] Individual

[« »] Joint Venture

[« »] Other « »

NAME OF PROJECT: (if applicable) «West BradfordHampden Township»

TYPE OF WORK: (file separate form for each Classification of Work)

[« »] General Construction

[« »] HVAC

[« »] Electrical

[« »] Plumbing

[« »] Other: (Specify) « »

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor? « »

§ 1.2 How many years has your organization been in business under its present business name? « »

§ 1.2.1 Under what other or former names has your organization operated?

« »

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation: « »

§ 1.3.2 State of incorporation: « »

§ 1.3.3 President's name: « »

§ 1.3.4 Vice-president's name(s)

« »

§ 1.3.5 Secretary's name: « »

§ 1.3.6 Treasurer's name: « »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.



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

§ 1.4 If your organization is a partnership, answer the following:

§ 1.4.1 Date of organization: « »

§ 1.4.2 Type of partnership (if applicable): « »

§ 1.4.3 Name(s) of general partner(s)

« »

§ 1.5 If your organization is individually owned, answer the following:

§ 1.5.1 Date of organization: « »

§ 1.5.2 Name of owner:

« »

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

« »

§ 2 LICENSING

§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

« »

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

« »

§ 3 EXPERIENCE

§ 3.1 List the categories of work that your organization normally performs with its own forces.

« »

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

« »

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

« »

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

« »

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

« »

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

« »

§ 3.4.1 State total worth of work in progress and under contract:

<< >>

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

<< >>

§ 3.5.1 State average annual amount of construction work performed during the past five years:

<< >>

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

<< >>

§ 4 REFERENCES

§ 4.1 Trade References:

<< >>

§ 4.2 Bank References:

<< >>

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

<< >>

§ 4.3.2 Name and address of agent:

<< >>

§ 5 FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

<< >>

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

<< >>

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

<< >>

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

<< >>

§ 6 SIGNATURE

§ 6.1 Dated at this << >> day of << >> << >>

Name of Organization: << >>

By: << >>

Title: << >>

§ 6.2

<< >>

M << >> being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this << >> day of << >> << >>

Notary Public: << >>

My Commission Expires: << >>

DRAFT AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

« »« »
« »

SURETY:

(Name, legal status and principal place of business)

« »« »
« »

OWNER:

(Name, legal status and address)

« »« »
« »

BOND AMOUNT: \$ « »

PROJECT:

(Name, location or address, and Project number, if any)

«West BradfordHampden Township»

« »
« »

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this « » day of « », « »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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

« »

(Witness)

« »

(Witness)

« »

(Contractor as Principal) (Seal)

« »

(Title)

« »

(Surety) (Seal)

« »

(Title)



DRAFT AIA[®] Document A312[™] - 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

« »
« »

SURETY:

(Name, legal status and principal place of business)

« »
« »

OWNER:

(Name, legal status and address)

« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

« Falls Township » West Bradford Township

« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond: None See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature:

Name and « »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1** have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2** have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company:

(Corporate Seal)

SURETY

Company:

(Corporate Seal)

Signature:

Name and Title:

« »« »

Address:

« »

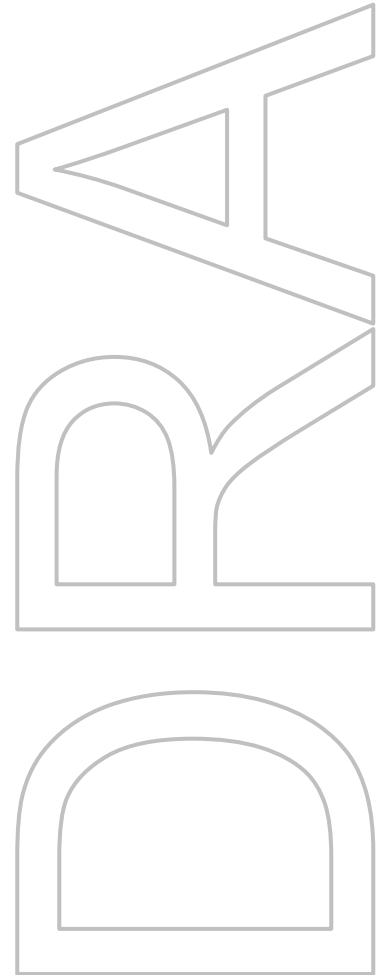
Signature:

Name and Title:

« »« »

Address:

« »



DRAFT AIA[®] Document A312[™] - 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

« »
« »

SURETY:

(Name, legal status and principal place of business)

« »
« »

OWNER:

(Name, legal status and address)

« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

« Falls Township » West Bradford Township

« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

Signature:

Name and « »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to

the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

<< >>

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: << >>< > _____

Address: << > _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: << >>< > _____

Address: << > _____

DRAFT AIA[®] Document G706[™] - 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

West Bradford Township

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER:

ARCHITECT:

CONTRACTOR:

SURETY:

OTHER:

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment Yes No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

DRAFT AIA[®] Document G706A[™] - 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*
West Bradford Township

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General
Construction

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER:

ARCHITECT:

CONTRACTOR:

SURETY:

OTHER:

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

DRAFT AIA® Document G707™ - 1994

Consent Of Surety to Final Payment

PROJECT: (Name and address)

West Bradford Township

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

TO OWNER: (Name and address)

CONTRACT DATED:

OWNER:

ARCHITECT:

CONTRACTOR:

SURETY:

OTHER:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

(Insert name and address of Surety)

on bond of

(Insert name and address of Contractor)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to

(Insert name and address of Owner)

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:

(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:

(Seal):

DRAFT AIA[®] Document G707A[™] - 1994

Consent of Surety to Reduction in or Partial Release of Retainage

PROJECT: *(Name and address)*
West Bradford Township

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER:

ARCHITECT:

CONTRACTOR:

SURETY:

OTHER:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of
(Insert name and address of Contractor)

hereby approves the reduction in or partial release of retainage to the Contractor as follows:

The Surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:
(Seal):

(Printed name and title)

SECTION 00-5310 – NON-COLLUSION AFFIDAVIT

State of _____

County of _____

I state that I am _____ of _____
(Title) (Entity Name)

and that I am authorized to make this affidavit on behalf of said entity.

I state that:

1. The price(s) and amount(s) of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.

2. Neither the price(s) nor the amount(s) of this bid, and neither the approximate price(s) nor approximate amount(s) of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

4. The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.

5. _____, its affiliates, subsidiaries, officers, directors, and
(Entity)

employees are not currently under the investigation by any governmental agency and have not in the last three (3) years been convicted of or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding of any public contract, except as follows*:

*A conviction or finding of liability does not prohibit West Bradford Township from accepting a bid or awarding a contract, but may be grounds for consideration of whether West Bradford Township should decline to award a contract on the basis of lack of responsibility.

NON-COLLUSION AFFIDAVIT

I state that _____ understands and
(Name of Firm)

acknowledges that the above representations are material and important, and will be relied on by West Bradford Township in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from West Bradford Township of the true facts relating to the submission of bids for this contract.

Name and Company Position

Signed and sworn to (or affirmed)
on the _____ day of _____, 2020

by _____
(insert name above)

Notary Public

Notary Seal:

THIS STATEMENT MUST BE COMPLETED, SIGNED, NOTARIZED AND RETURNED WITH THE BID OR THE BID WILL BE INVALID.

SECTION 00-5320 - CONTRACTOR'S WAIVER OF RIGHT TO FILE MECHANIC'S LIENS

WHEREAS, _____,

(Hereinafter the "Contractor") entered into a Contract with West Bradford Township (hereinafter the "Owner") to provide materials and perform labor necessary for the construction of the new Municipal Campus, (hereinafter the "Improvements") to be erected on real estate identified previously and described in the contract documents attached hereto (hereinafter the "Property").

NOW, THEREFORE, it is hereby stipulated and agreed by and between said parties, as part of said contract and for the consideration therein set forth, that neither the undersigned Contractor for himself and anyone else claiming through or under him, including any subcontractor or materialman or any other person furnishing labor or materials to the said Contractor under said Contract, shall file a lien or claim, commonly called a mechanic's lien for work done or other lien or claim of any kind whatsoever against the Improvements or the estate or title of the Owner in the Property or the curtilage or curtilages appurtenant thereto, by or in the name of Contractor or any subcontractor, materialman or laborers for work done or materials furnished under said contract and that all subcontractors, materialmen and laborers on the work shall look to and hold Contractor personally liable for all subcontracts, materials furnished and work and labor done, so that there shall not be any legal or lawful claim of any kind whatever against Owner for any work done or labor or materials furnished under said contract for and about the erection, construction and completion of the Improvements or under any contract for extra work, or work supplemental thereto, or otherwise.

This Agreement waiving the right of lien shall be an independent covenant and shall operate and be effective as well with respect to work done and materials furnished under any supplemental contract for extra work in the erection, construction and completion of the improvements as to any work and labor done and materials furnished under the contract.

In the event Contractor consists of more than one person, firm or corporation, the undertakings hereunder of each of such persons, firms or corporations shall be joint and several, and the word "Contractor" shall mean all or some or any of them for the purposes of this Agreement, the singular shall be deemed to include the plural, and that neuter shall be deemed to include the masculine and feminine as the context may require.

This stipulation is made and is intended to be filed with the County Prothonotary within ten (10) days after date, in accordance with the requirements of the State of Pennsylvania, in such case provided.

IN WITNESS WHEREOF, and intending to be legally bound hereby, the said parties have hereunto set their hands and seals this ____ day of _____, 20__:

ATTEST/WITNESS:

CONTRACTOR:

By: _____(SEAL)

ATTEST:

OWNER:

By: _____

(IF CONTRACTOR IS A CORPORATION, THIS AGREEMENT SHOULD BE EXECUTED BY ITS PRESIDENT OR VICE PRESIDENT, AND ATTESTED TO BY ITS SECRETARY OR TREASURER AND THE CORPORATE SEAL IMPRESSED. IF THE CONTRACTOR IS A PARTNERSHIP, THE GENERAL PARTNER OR ALL PARTNERS SHOULD EXECUTE THIS AGREEMENT AND IF THE CONTRACTOR IS AN INDIVIDUAL OR PARTNERSHIP ALL SIGNATURES SHOULD BE WITNESSED.)

SECTION 00-5400 - PREVAILING WAGE RATES

Please see the prevailing wage rates for this project at the web address below. A copy is attached but may not contain all information.

https://urldefense.proofpoint.com/v2/url?u=https-3A_www.dlsecureweb.pa.gov_PrevWage_Pages_Project.aspx-3FID-3D138996-26PageType-3D&d=DwIFAg&c=euGZstcaTDllvimEN8b7jXrwqOf-v5A_CdpgnVfiiMM&r=dohqWQ5F9HTh80iEEPyvp2S-qt9732XL-jEwsREIR1U&m=kzRGZzRROti658iviVbNYe-JyxW7RnDWA3yPI_bJFHU&s=3U7apA6vhs0w4VVYDMD937vPNF4GZ4sPeegOSm6BI2M&e=

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project Name:	Additions and Renovations to the West Bradford Township Building
Awarding Agency:	West Bradford Township
Contract Award Date:	12/15/2020
Serial Number:	20-06064
Project Classification:	Building/Highway
Determination Date:	9/30/2020
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Chester County

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/29/2017		\$47.30	\$34.85	\$82.15
Asbestos & Insulation Workers	5/1/2018		\$49.30	\$35.85	\$85.15
Asbestos & Insulation Workers	5/1/2019		\$51.20	\$36.95	\$88.15
Asbestos & Insulation Workers	6/1/2020		\$54.20	\$36.95	\$91.15
Boilermakers	1/1/2016		\$42.26	\$33.36	\$75.62
Boilermakers	3/1/2018		\$45.89	\$33.73	\$79.62
Bricklayer	5/1/2017		\$40.98	\$26.78	\$67.76
Bricklayer	5/1/2018		\$43.73	\$26.78	\$70.51
Bricklayer	5/1/2019		\$46.48	\$26.78	\$73.26
Bricklayer	5/1/2020		\$44.45	\$30.31	\$74.76
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$45.25	\$27.59	\$72.84
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$45.83	\$27.59	\$73.42
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019		\$46.54	\$27.59	\$74.13
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020		\$47.73	\$27.59	\$75.32
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019		\$40.47	\$27.59	\$68.06
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020		\$41.50	\$27.59	\$69.09
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$19.68	\$19.64	\$39.32
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$19.93	\$19.49	\$39.42
Carpenter - Rodman (Surveying & Layout)	5/1/2019		\$20.24	\$19.69	\$39.93
Carpenter - Rodman (Surveying & Layout)	5/1/2020		\$20.75	\$19.49	\$40.24
Carpenters	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenters	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenters	5/1/2019	4/30/2020	\$40.87	\$27.59	\$68.46
Carpenters	5/1/2020		\$41.90	\$27.59	\$69.49
Cement Masons	5/1/2017		\$36.45	\$31.76	\$68.21
Cement Masons	5/1/2018		\$37.50	\$32.26	\$69.76
Cement Masons	5/1/2019		\$38.50	\$32.81	\$71.31
Cement Masons	5/1/2020		\$39.45	\$33.46	\$72.91
DockBuilder/ Divers (Building Heavy & Highway)	5/1/2020		\$52.44	\$37.27	\$89.71
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2018		\$43.45	\$34.47	\$77.92
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
Dockbuilder/Piledriver (Building, Heavy, Highway)	11/1/2017		\$43.45	\$33.22	\$76.67
Dockbuilder/Piledriver (Building, Heavy, Highway)	5/1/2018		\$44.70	\$33.22	\$77.92
Drywall Finisher	5/1/2017		\$37.11	\$26.75	\$63.86
Drywall Finisher	5/1/2018		\$39.27	\$27.49	\$66.76
Drywall Finisher	5/1/2019		\$37.75	\$28.11	\$65.86
Drywall Finisher	5/1/2020		\$38.27	\$28.59	\$66.86
Electricians	5/29/2017		\$43.16	\$28.46	\$71.62
Electricians	6/4/2018	6/3/2019	\$42.87	\$30.41	\$73.28
Electricians	6/3/2019		\$42.87	\$32.41	\$75.28
Electricians	6/1/2020		\$44.47	\$33.31	\$77.78

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Electricians	5/31/2021		\$46.06	\$34.22	\$80.28
Electricians	5/30/2022		\$47.64	\$35.14	\$82.78
Electricians	5/29/2023		\$49.24	\$36.04	\$85.28
Elevator Constructor	1/1/2018		\$55.76	\$33.05	\$88.81
Elevator Constructor	1/1/2020		\$59.44	\$35.25	\$94.69
Floor Coverer	5/1/2019		\$44.37	\$28.44	\$72.81
Floor Coverer	5/1/2020		\$46.01	\$28.44	\$74.45
Floor Layer	5/1/2017		\$42.51	\$27.91	\$70.42
Floor Layer	5/1/2018		\$43.11	\$28.09	\$71.20
Glazier	5/1/2017		\$41.30	\$30.80	\$72.10
Glazier	5/1/2018		\$43.32	\$32.33	\$75.65
Glazier	5/1/2019		\$43.87	\$33.38	\$77.25
Glazier	5/1/2020		\$44.92	\$33.63	\$78.55
Interior Finish	5/1/2019		\$30.20	\$25.80	\$56.00
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2017		\$47.30	\$32.91	\$80.21
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2018		\$51.46	\$30.60	\$82.06
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2019		\$49.30	\$34.41	\$83.71
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2020		\$49.80	\$34.41	\$84.21
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$50.80	\$34.91	\$85.71
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$33.76	\$30.13	\$63.89
Iron Workers (Riggers)	7/1/2017		\$39.83	\$27.92	\$67.75
Ironworker (Rodman)	7/1/2017		\$42.56	\$29.30	\$71.86
Ironworker (Rodman)	7/1/2018		\$42.88	\$30.60	\$73.48
Ironworker (Rodman)	7/1/2019		\$43.88	\$30.85	\$74.73
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - General)	5/1/2020		\$32.05	\$25.25	\$57.30
Laborers (Class 01 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 01 - See notes)	5/1/2019		\$30.20	\$25.80	\$56.00
Laborers (Class 02 - See notes)	5/1/2017		\$30.85	\$25.65	\$56.50
Laborers (Class 02 - See notes)	5/1/2019		\$33.15	\$26.50	\$59.65
Laborers (Class 02 - see notes)	5/1/2020		\$35.15	\$26.15	\$61.30
Laborers (Class 03 - See notes)	5/1/2017		\$28.92	\$25.18	\$54.10
Laborers (Class 03 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 03 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 04 - See notes)	5/1/2017		\$28.95	\$24.95	\$53.90
Laborers (Class 04 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 04 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 05 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 05 - See notes)	5/1/2019		\$30.20	\$25.80	\$56.00
Laborers (Class 05 - See notes)	5/1/2020		\$32.05	\$25.25	\$57.30

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Landscape Laborer	5/1/2017		\$22.71	\$23.08	\$45.79
Landscape Laborer	5/1/2019		\$24.64	\$23.68	\$48.32
Landscape Laborer	5/1/2020		\$26.55	\$23.13	\$49.68
Marble Finisher	5/1/2017		\$35.55	\$24.17	\$59.72
Marble Finisher	5/1/2018		\$37.55	\$24.17	\$61.72
Marble Finisher	5/1/2019		\$39.75	\$24.17	\$63.92
Marble Finisher	5/1/2020		\$37.57	\$27.65	\$65.22
Marble Mason	5/1/2017		\$40.36	\$26.99	\$67.35
Marble Mason	5/1/2018		\$43.11	\$26.99	\$70.10
Marble Mason	5/1/2019		\$45.86	\$26.99	\$72.85
Marble Mason	5/1/2020		\$44.25	\$30.10	\$74.35
Mason Tender, Cement	5/1/2019		\$30.52	\$25.98	\$56.50
Millwright	7/1/2017		\$41.35	\$32.24	\$73.59
Millwright	5/1/2018		\$43.33	\$32.96	\$76.29
Millwright	5/1/2019		\$45.50	\$33.29	\$78.79
Millwright	6/8/2020		\$46.80	\$33.19	\$79.99
Millwright	5/1/2021		\$48.60	\$33.19	\$81.79
Millwright	5/1/2022		\$50.60	\$33.19	\$83.79
Operators (Building, Class 01 - See Notes)	5/1/2017		\$44.87	\$28.14	\$73.01
Operators (Building, Class 01 - See Notes)	5/1/2017		\$44.87	\$28.14	\$73.01
Operators (Building, Class 01 - See Notes)	5/1/2018		\$46.41	\$28.60	\$75.01
Operators (Building, Class 01 - See Notes)	5/1/2019		\$46.41	\$30.60	\$77.01
Operators (Building, Class 01 - See Notes)	5/1/2020		\$47.96	\$31.05	\$79.01
Operators (Building, Class 01 - See Notes)	5/1/2021		\$49.50	\$31.51	\$81.01
Operators (Building, Class 01A - See Notes)	5/1/2017		\$47.86	\$29.03	\$76.89
Operators (Building, Class 01A - See Notes)	5/1/2018		\$49.41	\$29.49	\$78.90
Operators (Building, Class 01A - See Notes)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators (Building, Class 01A - See Notes)	5/1/2020		\$50.96	\$31.94	\$82.90
Operators (Building, Class 01A - See Notes)	5/1/2021		\$52.51	\$32.39	\$84.90
Operators (Building, Class 02 - See Notes)	5/1/2017		\$44.62	\$28.07	\$72.69
Operators (Building, Class 02 - See Notes)	5/1/2018		\$46.16	\$28.53	\$74.69
Operators (Building, Class 02 - See Notes)	5/1/2019		\$46.16	\$30.53	\$76.69
Operators (Building, Class 02 - See Notes)	5/1/2020		\$47.71	\$30.98	\$78.69
Operators (Building, Class 02 - See Notes)	5/1/2021		\$49.25	\$31.44	\$80.69
Operators (Building, Class 02A - See Notes)	5/1/2017		\$47.61	\$28.97	\$76.58
Operators (Building, Class 02A - See Notes)	5/1/2018		\$49.16	\$29.42	\$78.58
Operators (Building, Class 02A - See Notes)	5/1/2019		\$49.17	\$31.41	\$80.58
Operators (Building, Class 02A - See Notes)	5/1/2020		\$50.71	\$31.87	\$82.58
Operators (Building, Class 02A - See Notes)	5/1/2021		\$52.26	\$32.32	\$84.58
Operators (Building, Class 03 - See Notes)	5/1/2017		\$40.53	\$26.87	\$67.40
Operators (Building, Class 03 - See Notes)	5/1/2018		\$42.07	\$27.33	\$69.40
Operators (Building, Class 03 - See Notes)	5/1/2019		\$42.08	\$29.32	\$71.40
Operators (Building, Class 03 - See Notes)	5/1/2020		\$43.62	\$29.78	\$73.40
Operators (Building, Class 03 - See Notes)	5/1/2021		\$45.16	\$30.24	\$75.40

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 04 - See Notes)	5/1/2017		\$40.24	\$26.78	\$67.02
Operators (Building, Class 04 - See Notes)	5/1/2018		\$41.78	\$27.22	\$69.00
Operators (Building, Class 04 - See Notes)	5/1/2019		\$41.78	\$29.23	\$71.01
Operators (Building, Class 04 - See Notes)	5/1/2020		\$43.32	\$29.69	\$73.01
Operators (Building, Class 04 - See Notes)	5/1/2021		\$44.87	\$30.14	\$75.01
Operators (Building, Class 05 - See Notes)	5/1/2017		\$38.51	\$26.27	\$64.78
Operators (Building, Class 05 - See Notes)	5/1/2018		\$40.05	\$26.73	\$66.78
Operators (Building, Class 05 - See Notes)	5/1/2019		\$40.06	\$28.72	\$68.78
Operators (Building, Class 05 - See Notes)	5/1/2020		\$41.60	\$29.18	\$70.78
Operators (Building, Class 05 - See Notes)	5/1/2021		\$43.14	\$29.64	\$72.78
Operators (Building, Class 06 - See Notes)	5/1/2017		\$37.52	\$25.98	\$63.50
Operators (Building, Class 06 - See Notes)	5/1/2018		\$39.07	\$26.43	\$65.50
Operators (Building, Class 06 - See Notes)	5/1/2019		\$39.07	\$28.43	\$67.50
Operators (Building, Class 06 - See Notes)	5/1/2020		\$40.61	\$28.89	\$69.50
Operators (Building, Class 06 - See Notes)	5/1/2021		\$42.16	\$29.34	\$71.50
Operators (Building, Class 07A- See Notes)	5/1/2017		\$54.14	\$32.47	\$86.61
Operators (Building, Class 07A- See Notes)	5/1/2018		\$55.99	\$33.02	\$89.01
Operators (Building, Class 07A- See Notes)	5/1/2019		\$56.30	\$35.11	\$91.41
Operators (Building, Class 07A- See Notes)	5/1/2020		\$58.16	\$35.65	\$93.81
Operators (Building, Class 07A- See Notes)	5/1/2021		\$60.00	\$36.21	\$96.21
Operators (Building, Class 07B- See Notes)	5/1/2017		\$53.84	\$32.40	\$86.24
Operators (Building, Class 07B- See Notes)	5/1/2018		\$55.70	\$32.92	\$88.62
Operators (Building, Class 07B- See Notes)	5/1/2019		\$56.00	\$35.03	\$91.03
Operators (Building, Class 07B- See Notes)	5/1/2020		\$57.86	\$35.57	\$93.43
Operators (Building, Class 07B- See Notes)	5/1/2021		\$59.72	\$36.11	\$95.83
Painters Class 1 (see notes)	5/1/2017		\$37.82	\$26.46	\$64.28
Painters Class 1 (see notes)	5/1/2018		\$38.64	\$27.64	\$66.28
Painters Class 1 (see notes)	5/1/2019		\$39.04	\$28.99	\$68.03
Painters Class 1 (see notes)	2/1/2020		\$46.16	\$28.75	\$74.91
Painters Class 1 (see notes)	5/1/2020		\$40.14	\$29.64	\$69.78
Painters Class 2 (see notes)	2/1/2017		\$53.67	\$26.09	\$79.76
Painters Class 2 (see notes)	2/1/2018		\$54.14	\$27.27	\$81.41
Painters Class 2 (see notes)	2/1/2019		\$55.52	\$28.39	\$83.91
Painters Class 2 (see notes)	2/1/2020		\$57.12	\$28.79	\$85.91
Plasterers	5/1/2017		\$37.42	\$28.83	\$66.25
Plasterers	5/1/2018		\$37.42	\$30.04	\$67.46
Plasterers	5/1/2019		\$37.72	\$30.74	\$68.46
Plasterers	5/1/2020		\$38.12	\$31.34	\$69.46
plumber	5/1/2018		\$53.45	\$33.54	\$86.99
plumber	5/1/2019		\$55.45	\$34.54	\$89.99
plumber	8/1/2020		\$57.33	\$35.66	\$92.99
Plumbers	5/1/2017		\$51.42	\$32.57	\$83.99
Pointers, Caulkers, Cleaners	5/1/2017		\$42.26	\$25.69	\$67.95
Pointers, Caulkers, Cleaners	5/1/2018		\$45.01	\$25.69	\$70.70

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Pointers, Caulkers, Cleaners	5/1/2019		\$47.76	\$25.69	\$73.45
Pointers, Caulkers, Cleaners	5/1/2020		\$45.75	\$29.20	\$74.95
Roofers (Composition)	5/1/2017		\$36.15	\$30.22	\$66.37
Roofers (Composition)	5/1/2018		\$37.15	\$31.27	\$68.42
Roofers (Composition)	5/1/2019		\$38.35	\$31.80	\$70.15
Roofers (Composition)	5/1/2020		\$39.50	\$32.30	\$71.80
Roofers (Shingle)	5/1/2016		\$25.70	\$19.17	\$44.87
Roofers (Shingle)	5/1/2019		\$28.50	\$20.87	\$49.37
Roofers (Shingle)	5/1/2020		\$29.50	\$21.25	\$50.75
Roofers (Slate & Tile)	5/1/2016		\$28.70	\$19.17	\$47.87
Roofers (Slate & Tile)	5/1/2018		\$30.50	\$20.37	\$50.87
Roofers (Slate & Tile)	5/1/2019		\$31.50	\$20.87	\$52.37
Roofers (Slate & Tile)	5/1/2020		\$32.50	\$21.25	\$53.75
Sheet Metal Workers	5/1/2017		\$46.42	\$39.51	\$85.93
Sheet Metal Workers	5/1/2018		\$47.58	\$41.60	\$89.18
Sheet Metal Workers	5/1/2019		\$49.79	\$42.89	\$92.68
Sheet Metal Workers	5/1/2020		\$52.04	\$44.19	\$96.23
Sheet Metal Workers	5/1/2021		\$49.79	\$49.94	\$99.73
Sign Makers and Hangars	5/20/2011		\$23.70	\$17.69	\$41.39
Sprinklerfitters	4/1/2017		\$37.40	\$21.74	\$59.14
Sprinklerfitters	4/1/2018		\$38.80	\$22.74	\$61.54
Sprinklerfitters	5/1/2019		\$57.20	\$28.32	\$85.52
Sprinklerfitters	5/1/2020		\$59.10	\$29.22	\$88.32
Steamfitters	5/1/2017		\$54.64	\$32.84	\$87.48
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.76
Steamfitters	5/1/2019		\$58.17	\$35.99	\$94.16
Steamfitters	5/1/2020		\$60.47	\$37.24	\$97.71
Steamfitters	5/1/2021		\$60.47	\$40.89	\$101.36
Steamfitters	5/1/2022		\$60.47	\$44.63	\$105.10
Stone Masons	5/1/2017		\$40.36	\$26.99	\$67.35
Stone Masons	5/1/2018		\$43.11	\$26.99	\$70.10
Stone Masons	5/1/2019		\$45.86	\$26.99	\$72.85
Stone Masons	5/1/2020		\$44.25	\$30.10	\$74.35
Terrazzo Finisher	5/1/2017		\$39.06	\$22.73	\$61.79
Terrazzo Finisher	5/1/2018		\$41.31	\$22.73	\$64.04
Terrazzo Finisher	5/1/2019		\$43.61	\$22.73	\$66.34
Terrazzo Finisher	5/1/2020		\$41.46	\$26.37	\$67.83
Terrazzo Grinder	5/1/2016		\$37.33	\$22.73	\$60.06
Terrazzo Grinder	5/1/2017		\$39.33	\$22.73	\$62.06
Terrazzo Grinder	5/1/2018		\$41.58	\$22.73	\$64.31
Terrazzo Grinder	5/1/2019		\$43.88	\$22.73	\$66.61
Terrazzo Grinder	5/1/2020		\$41.73	\$26.37	\$68.10
Terrazzo Mechanics	5/1/2017		\$43.71	\$24.81	\$68.52
Terrazzo Mechanics	5/1/2018		\$46.46	\$24.81	\$71.27

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Terrazzo Mechanic	5/1/2019		\$49.21	\$24.81	\$74.02
Terrazzo Mechanic	5/1/2020		\$47.51	\$28.01	\$75.52
Tile Finisher	5/1/2017		\$35.55	\$24.17	\$59.72
Tile Finisher	5/1/2018		\$37.55	\$24.17	\$61.72
Tile Finisher	5/1/2019		\$39.75	\$24.17	\$63.92
Tile Finisher	5/1/2020		\$37.57	\$27.65	\$65.22
Tile Setter	5/1/2016		\$41.21	\$24.81	\$66.02
Tile Setter	5/1/2017		\$43.71	\$24.81	\$68.52
Tile Setter	5/1/2018		\$46.46	\$24.81	\$71.27
Tile Setter	5/1/2019		\$49.21	\$24.81	\$74.02
Tile Setter	5/1/2020		\$47.51	\$28.01	\$75.52
Truckdriver class 1(see notes)	5/1/2017		\$30.46	\$17.96	\$48.42
Truckdriver class 1(see notes)	5/1/2018		\$31.93	\$17.96	\$49.89
Truckdriver class 1(see notes)	5/1/2019		\$32.21	\$19.19	\$51.40
Truckdriver class 1(see notes)	5/1/2020		\$34.93	\$17.96	\$52.89
Truckdriver class 1(see notes)	5/1/2021		\$36.48	\$17.96	\$54.44
Truckdriver class 2 (see notes)	5/1/2017		\$30.56	\$17.96	\$48.52
Truckdriver class 2 (see notes)	5/1/2018		\$32.03	\$17.96	\$49.99
Truckdriver class 2 (see notes)	5/1/2019		\$32.31	\$19.19	\$51.50
Truckdriver class 2 (see notes)	5/1/2020		\$35.03	\$17.96	\$52.99
Truckdriver class 2 (see notes)	5/1/2021		\$36.58	\$17.96	\$54.54
Truckdriver class 3 (see notes)	5/1/2017		\$30.81	\$17.96	\$48.77
Truckdriver class 3 (see notes)	5/1/2018		\$32.28	\$17.96	\$50.24
Truckdriver class 3 (see notes)	5/1/2019		\$32.56	\$19.19	\$51.75
Truckdriver class 3 (see notes)	5/1/2020		\$35.28	\$17.96	\$53.24
Truckdriver class 3 (see notes)	5/1/2021		\$36.83	\$17.96	\$54.79
Wallcoverer	5/1/2020		\$40.52	\$29.64	\$70.16
Window Film / Tint Installer	6/1/2019		\$24.52	\$12.08	\$36.60

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$51.42	\$27.39	\$78.81
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$53.20	\$27.69	\$80.89
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019	4/30/2020	\$55.38	\$27.69	\$83.07
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020	4/30/2021	\$57.63	\$27.69	\$85.32
Carpenter - Chief of Party (Surveying & Layout)	5/1/2021		\$59.93	\$27.69	\$87.62
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$44.71	\$27.39	\$72.10
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.95
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019	4/30/2020	\$48.16	\$27.69	\$75.85
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020	4/30/2021	\$50.11	\$27.69	\$77.80
Carpenter - Instrument Person (Surveying & Layout)	5/1/2021		\$52.11	\$27.69	\$79.80
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$35.77	\$21.19	\$56.96
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$37.01	\$21.34	\$58.35
Carpenter - Rodman (Surveying & Layout)	5/1/2019	4/30/2020	\$38.53	\$21.34	\$59.87
Carpenter - Rodman (Surveying & Layout)	5/1/2020	4/30/2021	\$40.09	\$21.34	\$61.43
Carpenter - Rodman (Surveying & Layout)	5/1/2021		\$41.69	\$21.34	\$63.03
Carpenter	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.95
Carpenter	5/1/2019	4/30/2020	\$47.81	\$28.04	\$75.85
Carpenter	5/1/2020	4/30/2021	\$49.76	\$28.04	\$77.80
Carpenter	5/1/2021		\$51.76	\$28.04	\$79.80
Carpenters	5/1/2017		\$44.71	\$27.39	\$72.10
Carpenters	5/1/2018		\$46.56	\$27.39	\$73.95
Carpenters	5/1/2019		\$48.46	\$27.39	\$75.85
Carpenters	5/1/2020		\$50.41	\$27.39	\$77.80
Carpenters	5/1/2021		\$52.41	\$27.39	\$79.80
Cement Masons	5/1/2017		\$34.45	\$31.51	\$65.96
Cement Masons	5/1/2018		\$35.65	\$32.01	\$67.66
Cement Masons	5/1/2019		\$37.90	\$31.51	\$69.41
Cement Masons	5/1/2020		\$37.95	\$33.26	\$71.21
DockBuilder/ Divers (Building Heavy & Highway)	5/1/2020		\$52.44	\$37.27	\$89.71
DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
Electric Lineman	5/29/2017		\$52.60	\$26.37	\$78.97
Electric Lineman	5/28/2018		\$53.64	\$27.45	\$81.09
Electric Lineman	5/27/2019		\$54.66	\$28.56	\$83.22
Electric Lineman	6/1/2020		\$55.96	\$29.76	\$85.72
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2017		\$46.20	\$31.26	\$77.46
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$33.76	\$30.13	\$63.89
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$50.80	\$34.91	\$85.71
Iron Workers	7/1/2017		\$47.30	\$32.91	\$80.21
Iron Workers	7/1/2019		\$49.30	\$34.41	\$83.71
Iron Workers	1/1/2020		\$49.80	\$34.41	\$84.21
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - See notes)	5/1/2017		\$29.75	\$25.65	\$55.40

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 01 - See notes)	5/1/2018		\$31.25	\$25.65	\$56.90
Laborers (Class 01 - See notes)	5/1/2019		\$31.95	\$26.50	\$58.45
Laborers (Class 01 - See notes)	5/1/2020		\$33.95	\$26.15	\$60.10
Laborers (Class 01 - See notes)	5/1/2021		\$36.20	\$25.65	\$61.85
Laborers (Class 02 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
Laborers (Class 02 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.10
Laborers (Class 02 - See notes)	5/1/2019		\$32.15	\$26.50	\$58.65
Laborers (Class 02 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
Laborers (Class 02 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.05
Laborers (Class 03 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
Laborers (Class 03 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.10
Laborers (Class 03 - See notes)	5/1/2019		\$32.15	\$26.50	\$58.65
Laborers (Class 03 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
Laborers (Class 03 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.05
Laborers (Class 04 - See notes)	5/1/2017		\$24.55	\$25.65	\$50.20
Laborers (Class 04 - See notes)	5/1/2018		\$26.05	\$25.65	\$51.70
Laborers (Class 04 - See notes)	5/1/2019		\$26.75	\$26.50	\$53.25
Laborers (Class 04 - See notes)	5/1/2020		\$28.75	\$26.15	\$54.90
Laborers (Class 04 - See notes)	5/1/2021		\$31.00	\$25.65	\$56.65
Laborers (Class 05 - See notes)	5/1/2017		\$30.60	\$25.65	\$56.25
Laborers (Class 05 - See notes)	5/1/2018		\$32.10	\$25.65	\$57.75
Laborers (Class 05 - See notes)	5/1/2019		\$32.80	\$26.50	\$59.30
Laborers (Class 05 - See notes)	5/1/2020		\$34.80	\$26.15	\$60.95
Laborers (Class 05 - See notes)	5/1/2021		\$37.05	\$25.65	\$62.70
Laborers (Class 06 - See notes)	5/1/2017		\$30.65	\$25.65	\$56.30
Laborers (Class 06 - See notes)	5/1/2018		\$32.15	\$25.65	\$57.80
Laborers (Class 06 - See notes)	5/1/2019		\$32.85	\$26.50	\$59.35
Laborers (Class 06 - See notes)	5/1/2020		\$34.85	\$26.15	\$61.00
Laborers (Class 06 - See notes)	5/1/2021		\$37.10	\$25.65	\$62.75
Laborers (Class 07 - See notes)	5/1/2017		\$30.50	\$25.65	\$56.15
Laborers (Class 07 - See notes)	5/1/2018		\$32.00	\$25.65	\$57.65
Laborers (Class 07 - See notes)	5/1/2019		\$32.70	\$26.50	\$59.20
Laborers (Class 07 - See notes)	5/1/2020		\$34.70	\$26.15	\$60.85
Laborers (Class 07 - See notes)	5/1/2021		\$36.95	\$25.65	\$62.60
Laborers (Class 08 - See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
Laborers (Class 08 - See notes)	5/1/2018		\$31.75	\$25.65	\$57.40
Laborers (Class 08 - See notes)	5/1/2019		\$32.45	\$26.50	\$58.95
Laborers (Class 08 - See notes)	5/1/2020		\$34.45	\$26.15	\$60.60
Laborers (Class 08 - See notes)	5/1/2021		\$36.70	\$25.65	\$62.35
Laborers (Class 09 - See notes)	5/1/2017		\$30.10	\$25.65	\$55.75
Laborers (Class 09 - See notes)	5/1/2018		\$31.60	\$25.65	\$57.25
Laborers (Class 09 - See notes)	5/1/2019		\$32.30	\$26.50	\$58.80
Laborers (Class 09 - See notes)	5/1/2020		\$34.30	\$26.15	\$60.45
Laborers (Class 09 - See notes)	5/1/2021		\$36.55	\$25.65	\$62.20

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 10- See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
Laborers (Class 10- See notes)	5/1/2018		\$33.30	\$25.65	\$58.95
Laborers (Class 10- See notes)	5/1/2019		\$32.45	\$26.50	\$58.95
Laborers (Class 10- See notes)	5/1/2020		\$34.45	\$26.15	\$60.60
Laborers (Class 10- See notes)	5/1/2021		\$36.70	\$25.65	\$62.35
Laborers (Class 11 -See Notes)	5/1/2017		\$30.15	\$25.65	\$55.80
Laborers (Class 11 -See Notes)	5/1/2018		\$31.55	\$25.65	\$57.20
Laborers (Class 11 -See Notes)	5/1/2019		\$32.35	\$26.50	\$58.85
Laborers (Class 11 -See Notes)	5/1/2020		\$34.35	\$26.15	\$60.50
Laborers (Class 11 -See Notes)	5/1/2021		\$36.50	\$25.65	\$62.15
Laborers (Class 12 -See Notes)	5/1/2017		\$30.95	\$25.65	\$56.60
Laborers (Class 12 -See Notes)	5/1/2018		\$32.45	\$25.65	\$58.10
Laborers (Class 12 -See Notes)	5/1/2019		\$34.05	\$26.50	\$60.55
Laborers (Class 12 -See Notes)	5/1/2020		\$36.05	\$26.15	\$62.20
Laborers (Class 12 -See Notes)	5/1/2021		\$37.40	\$25.65	\$63.05
Laborers (Class 13 -See Notes)	5/1/2017		\$33.88	\$25.65	\$59.53
Laborers (Class 13 -See Notes)	5/1/2018		\$35.38	\$25.65	\$61.03
Laborers (Class 13 -See Notes)	5/1/2019		\$36.08	\$26.50	\$62.58
Laborers (Class 13 -See Notes)	5/1/2020		\$38.08	\$26.15	\$64.23
Laborers (Class 13 -See Notes)	5/1/2021		\$40.33	\$25.65	\$65.98
Laborers (Class 14 -See Notes)	5/1/2017		\$30.00	\$25.65	\$55.65
Laborers (Class 14 -See Notes)	5/1/2018		\$31.50	\$25.65	\$57.15
Laborers (Class 14 -See Notes)	5/1/2019		\$32.20	\$26.50	\$58.70
Laborers (Class 14 -See Notes)	5/1/2020		\$34.20	\$26.15	\$60.35
Laborers (Class 14 -See Notes)	5/1/2021		\$36.45	\$25.65	\$62.10
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2017		\$23.52	\$17.58	\$41.10
Laborers Utility (PGW ONLY)	5/1/2017		\$30.55	\$17.58	\$48.13
Landscape Laborer	5/1/2015		\$20.29	\$22.30	\$42.59
Landscape Laborer	5/1/2016		\$21.19	\$22.65	\$43.84
Landscape Laborer	5/1/2019		\$24.22	\$23.50	\$47.72
Landscape Laborer	5/1/2020		\$26.13	\$22.95	\$49.08
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2017		\$44.87	\$28.14	\$73.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.41	\$28.60	\$75.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.41	\$30.60	\$77.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.96	\$31.05	\$79.01
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.86	\$29.03	\$76.89
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.41	\$29.49	\$78.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.96	\$31.94	\$82.90

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2017		\$44.62	\$28.07	\$72.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.16	\$28.53	\$74.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.16	\$30.53	\$76.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.71	\$30.98	\$78.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.61	\$28.97	\$76.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.16	\$29.42	\$78.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.17	\$31.41	\$80.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.71	\$31.87	\$82.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.53	\$26.87	\$67.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2018		\$42.07	\$27.33	\$69.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2019		\$42.08	\$29.32	\$71.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2020		\$43.62	\$29.78	\$73.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.24	\$26.78	\$67.02
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2018		\$41.78	\$27.22	\$69.00
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2019		\$41.78	\$29.23	\$71.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2020		\$43.32	\$29.69	\$73.01
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2017		\$38.51	\$26.27	\$64.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2018		\$40.05	\$26.73	\$66.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2019		\$40.06	\$28.72	\$68.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2020		\$41.60	\$29.18	\$70.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2017		\$37.52	\$25.98	\$63.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2018		\$39.07	\$26.43	\$65.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2019		\$39.07	\$28.43	\$67.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2020		\$40.61	\$28.89	\$69.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2017		\$54.14	\$32.47	\$86.61
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.99	\$33.02	\$89.01
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.30	\$35.11	\$91.41

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 20-06064 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2020		\$58.16	\$35.65	\$93.81
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2017		\$53.84	\$32.40	\$86.24
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.70	\$32.92	\$88.62
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.00	\$35.03	\$91.03
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2020		\$57.86	\$35.57	\$93.43
Painters (Bridges, Stacks, Towers)	2/1/2017		\$53.67	\$26.09	\$79.76
Painters (Bridges, Stacks, Towers)	2/1/2018		\$54.14	\$27.27	\$81.41
Painters (Bridges, Stacks, Towers)	2/1/2019		\$55.52	\$28.39	\$83.91
Painters (Bridges, Stacks, Towers)	2/1/2020		\$57.12	\$28.79	\$85.91
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		\$51.91	\$32.53	\$84.44
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2020		\$60.47	\$36.93	\$97.40
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.76
Truckdriver class 1(see notes)	5/1/2017		\$30.31	\$17.96	\$48.27
Truckdriver class 1(see notes)	5/1/2018		\$31.78	\$17.96	\$49.74
Truckdriver class 1(see notes)	5/1/2019		\$32.06	\$19.19	\$51.25
Truckdriver class 1(see notes)	5/1/2020		\$34.78	\$17.96	\$52.74
Truckdriver class 1(see notes)	5/1/2021		\$36.33	\$17.96	\$54.29
Truckdriver class 2 (see notes)	5/1/2017		\$30.41	\$17.96	\$48.37
Truckdriver class 2 (see notes)	5/1/2018		\$31.88	\$17.96	\$49.84
Truckdriver class 2 (see notes)	5/1/2019		\$32.16	\$19.19	\$51.35
Truckdriver class 2 (see notes)	5/1/2020		\$34.88	\$17.96	\$52.84
Truckdriver class 2 (see notes)	5/1/2021		\$36.43	\$17.96	\$54.39
Truckdriver class 3 (see notes)	5/1/2017		\$30.66	\$17.96	\$48.62
Truckdriver class 3 (see notes)	5/1/2018		\$32.13	\$17.96	\$50.09
Truckdriver class 3 (see notes)	5/1/2019		\$32.41	\$19.19	\$51.60
Truckdriver class 3 (see notes)	5/1/2020		\$35.13	\$17.96	\$53.09
Truckdriver class 3 (see notes)	5/1/2021		\$36.68	\$17.96	\$54.64

SECTION 01-1000 – SUMMARY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Work by Owner.
- 4. Work under separate contracts.
- 5. Future work.
- 6. Owner-furnished products.
- 7. Access to site.
- 8. Work restrictions.

B. Related Requirements:

- 1. Section 01-5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: West Bradford Township Administration Building

- 1. Project Location: 1385 Campus Drive, Downingtown, PA

B. Owner: As above

C. Owner's Representative: Ron Youtz, Public Works Director

- D. Construction Manager: None
- E. Architect: Kimmel Bogrette Architecture + Site. Architect's Representative: Jonathan Trump
- F. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. Civil Engineering: Edward B. Walsh and Associates, Inc., 855 Springdale Drive, Suite 202, Exton, PA. 19341
 - 2. Structural Engineering: Baker Ingram & Associates, 1547 Oregon Pike, Lancaster, PA
 - 3. MEPFP Engineering: Sharpe Engineering, Inc., 130 Futura Drive, Suite 200, Limerick Twp, PA 19464
- G. Other Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. None:

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Additions and renovations to the existing township administration building. The work will be done in 2 phases as indicated in the contract documents.
- B. Type of Contract:
 - 1. Project will be constructed under coordinated, concurrent multiple contracts. See Section 01-1200 "Multiple Contract Summary" for a description of work included under each of the multiple contracts and for the responsibilities of Project coordinator. Contracts for this Project include the following:
 - a. General Construction.
 - b. Mechanical
 - c. Electrical (with portions of telecom, data and A/V as per documents)
 - d. Plumbing (including Fire Protection)

1.5 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - 1. Voice, data, A/V equipment installation.
 - 2. Security equipment installation
 - 3. Furniture installation

1.6 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - 1. See section 1.5 B above.

1.7 FUTURE WORK

- A. The Contract Documents include requirements that will allow Owner to carry out future work following completion of this Project; provide for the following future work:
 - 1. None

1.8 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
- B. Owner-Furnished Products:
 - 1. Furnishings, fixtures and equipment.

1.9 ACCESS TO SITE

- A. General: Contractor shall have use of Project site for construction operations during construction period as defined by the civil plans and the phasing plans indicated in the architectural drawings. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to the site and as required for utility connections.
 - 2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - c. No contractor parking is permitted outside the limits of the current phase.

1.10 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work on the project to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.
 - 1. Weekend Hours: As per Township ordinance.
 - 2. Early Morning Hours: As approved by the Township.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.

- D. Nonsmoking Building: Smoking is not permitted within the building after enclosure or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- F. The Owner reserves the right to have any worker removed from the site for any reason.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-1000

SECTION 01-1200 - MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination.
- B. Specific requirements for Work of each contract are also indicated in individual Specification Sections and on Drawings.
- C. Related Requirements:
 - 1. Section 01-1000 "Summary" for the Work covered by the Contract Documents, restrictions on use of Project site, coordination with occupants, and work restrictions.
 - 2. Section 01-3100 "Project Management and Coordination" for general coordination requirements.
 - 3. Section 01-5000 "Temporary Facilities and Controls - Multi Prime Contracts".

1.3 PROJECT COORDINATOR

- A. Project coordinator shall be responsible for coordination between the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract. The project coordinator will be a representative of the General Contractor. The Project Coordinator shall be experienced in administration and supervision of building construction, including mechanical, plumbing, electrical, and fire protection work.
- B. Mechanical/Electrical/Plumbing/Fire Protection (MEPFP) Coordinator, who shall be subordinate to Project Coordinator, shall be responsible for coordination between the Mechanical Contract, Plumbing Contract and Electrical Contract. The MEPFP Coordinator will be a representative of the Mechanical Contractor. The MEPFP Coordinator shall be

experienced in coordination of mechanical, plumbing, electrical, and fire protection construction, including coordination of type of operations required for this Project

- C. Coordination activities of the MEPFP Project Coordinator include, but are not limited to, the following:
1. Schedule and sequence mechanical, plumbing, electrical, and fire protection activities.
 2. Coordinate sharing access to workspaces by mechanical, plumbing, electrical, and fire protection contractors.
 3. Coordinate integration of mechanical, plumbing, electrical, and fire protection work into limited spaces.
 4. Coordinate protection of mechanical, plumbing, electrical, and fire protection contractors' work.
 5. Prepare Coordination Drawings; refer to Section 01-3400.
 6. Coordinate tests and inspections for mechanical, plumbing, electrical, and fire protection work.
 7. Coordinate mechanical, plumbing, electrical, and fire protection temporary services and facilities:

1.4 COORDINATION ACTIVITIES

- A. Coordination activities of Project Coordinator include, but are not limited to, the following:
1. Provide overall coordination of the Work.
 2. Coordinate shared access to workspaces.
 3. Coordinate product selections for compatibility.
 4. Provide overall coordination of temporary facilities and controls.
 5. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
 6. Coordinate construction and operations of the Work with work performed by each Contract and Owner's subcontractors and separate contracts.
 7. Prepare coordination drawings in collaboration with each contractor to coordinate work by more than one contract.
 8. Coordinate sequencing and scheduling of the Work. Include the following:

- a. Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
 - b. Prepare a combined contractors' construction schedule for entire Project. Base schedule on preliminary construction schedule. Secure time commitments for performing critical construction activities from contractors. Show activities of each contract on a separate sheet. Prepare a simplified summary sheet indicating combined construction activities of contracts.
 - 1) Submit schedules for approval.
 - 2) Distribute copies of approved schedules to contractors.
9. Provide photographic documentation.
 10. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
 11. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project site.
 12. Provide field surveys of in-progress construction and site work.
 13. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
 14. Coordinate cutting and patching.
 15. Coordinate protection of the Work.
 16. Coordinate firestopping.
 17. Coordinate completion of interrelated punch list items.
 18. Coordinate preparation of Project record documents if information from more than one contractor is to be integrated with information from other contractors to form one combined record.
 19. Final Cleaning
 20. Provide copies of approved submittals to Owner.
 21. Coordinate with Owner's Vendors for owner furnished items.

1.5 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.

1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
2. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each contract for its own work.
3. Furnishing of access panels for the work of each contract shall be the work of each contract for its own work. Installation of access panels shall be the work of the General Construction Contract.
4. Roof-mounted equipment curbs for the work of each contract shall be provided by the contract and installed by the General Construction Contract.
5. Painting for the work of each contract shall be the work of the General Construction Contract.
6. Cutting and Patching: Provided under each contract for its own work.
7. Through-penetration firestopping for the work of each contract shall be provided by each contract for its own work.
8. Contractors' Startup Construction Schedule: Within five working days after startup horizontal bar-chart-type construction schedule submittal has been received from Project coordinator, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.

B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.

1. The General Construction Contract shall coordinate substitutions.

C. Temporary Facilities and Controls: Refer to Section 01-5000 "Temporary Facilities and Controls".

1.6 GENERAL CONSTRUCTION CONTRACT

A. Work in the General Construction Contract includes, but is not limited to, the following:

1. Site preparation, including clearing, building demolition and relocations, and earthwork.
2. Site water supply and distribution (domestic and fire) from street to building as per site plans.
3. Site sanitary sewerage.
4. Site improvements, including roadways, parking lots, and storm water management, pedestrian paving, site development furnishings and equipment, and landscaping.
5. Foundations, including footings, foundation walls.
6. Slabs-on-grade, including earthwork, sub drainage systems, and insulation.

7. Below-grade building construction, including excavation, backfill, and thermal and moisture protection.
8. Superstructure, including floor and roof construction.
9. Exterior closure, including walls, parapets, doors, windows, and exterior louvers.
10. Roofing, including coverings, flashings roof specialties.
11. Interior construction, including partitions, doors, interior glazed openings, and fittings.
12. Fire-protection specialties (extinguishers and cabinets).
13. Stairs, including railings and finishes.
14. Interior finishes finish carpentry architectural woodwork and built-in casework.
15. Miscellaneous items, including concrete equipment bases and painting of mechanical and electrical work.
16. Conveying systems, including elevators.
17. Equipment as per the specifications
18. Meter pit and piping assembly
19. Pools construction and equipment

1.7 PLUMBING CONTRACT

A. Work in the Plumbing Contract includes, but is not limited to, the following:

1. Site special plumbing systems, if any.
2. Termination and cap of water, gas and sanitary to the existing building prior to demolition. See demo specifications.
3. Plumbing fixtures.
4. Domestic water distribution to 5' outside the building including final connections
5. Sanitary waste to 5' outside the building including final connections
6. Plumbing connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and Fire Protection Contract.
7. Excavations as per Multi Prime Contractor Checklist.
8. NOTE: Owner will pay for all tap, meter and capacity fees required by the water, sewer and gas authorities.

1.8 HVAC CONTRACT

A. Work in the HVAC Contract includes, but is not limited to, the following:

1. Energy supply.

2. Termination of mechanical equipment prior to demolition. See demo specifications.
3. HVAC systems and equipment.
4. HVAC instrumentation and controls.
5. HVAC testing, adjusting, and balancing.
6. Building automation system.
7. Mechanical connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and Fire Protection Contract.

1.9 ELECTRICAL CONTRACT

A. Work in the Electrical Contract includes, but is not limited to, the following:

1. Site electrical distribution.
2. All temporary electric for site, trailers and building.
3. Termination and cap of electrical service to the existing building prior to demolition. See demo specifications
4. Site lighting.
5. Electrical service and distribution.
6. Exterior and interior lighting and light pole bases.
7. Special electrical systems, including the following:
 - a. Packaged engine generator systems, if required.
8. Electrical connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract, Electrical Contract, and Fire Protection Contract.
9. Excavations as per Multi Prime Contractor Checklist

1.10 FIRE PROTECTION CONTRACT (this is included with the Plumbing Contract scope of work)

A. Work in the Fire Contract includes, but is not limited to, the following:

1. Extension of fire service to 5' outside the building.
2. All required piping, valves, pumps, gauges, sensors etc.
3. All required pipes, fittings and heads required for a code compliant installation.

4. Signed and sealed calculations and shop drawing layout for approval by the Code Official.
5. Connections to equipment furnished by the General Construction Contract, Plumbing Contract, HVAC Contract and Electrical Contract.
6. Excavations as per Multi Prime Contractor Checklist.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-1200

SECTION 01-1201 - PRIME CONTRACTOR'S CHECKLIST

ITEMS	FURN GC	FURN TRADE	INSTALL GC	INSTALL TRADE	F & I OWNER	LOCAL UTIL.
Demo Existing Bldg and Site Improvements	X		X			
Terminate and Demo Existing Bldg Utilities, (see specs for info)		X		X		
Interior and Exterior concrete pads for MEP	X		X			
MEP equipment curbs on building		X	X			
Painting MEP Equipment	X		X			
Louvers, Exterior	X		X			
Core Holes				X		
Foundation Sleeves		X	X			
Wall Penetrations MEP equipment				X		
Lintels, All required For equipment	X		X			
Misc structural support for MEP equipment	X		X			
Roof Penetrations MEP equipment				X		
Floor Penetrations MEP equipment				X		
New Work Cutting (walls, floors, clgs)		X		X		
New Work Patch & Repair (exter walls, floors, roof)		X		X		
Gas pipe concrete pads	X		X			

(if req'd)						
Access Panels		X	X			
Roof Flashing MEP equipment (flues, caps, curbs etc.)	X		X			
Floor Drains		X		X		
Caulk all penetrations in walls	X		X			
Paving (repair and binder course)	X		X			
Paving (wearing course), if req'd	X		X			
Parking stripe & bumpers	X		X			
Utilities Interior - to 5' outside bldg						
a. Sanitary Main and final hook up to site main		X		X		
b. Foundation Drain	X		X			
c. Water Lines		X		X		
d. Gas Lines		X		X		
e. Electric (to trans)		X		X		
f. Telephone Service (EC provide req'd conduit exterior to demark)		X		X		
g. Cable Service (to run in telephone conduit)		X		X		
h. Security System equipment		X		X		
j. new conduit and boxes for phone, data, security,		X		X		

cameras, etc						
k. All excavation / shoring / pumping / backfilling		X		X		
l. Site Repair & Restoration (Grass, conc, paving etc.)	X		X			
m. Testing & Flushing lines		X		X		
n. security camera and door wiring		X		X		
Site Utilities (start to 5' from building)						
Electric excavating, shoring, backfill.		X		X		
Electrical Conduits		X		X		
Site Light Circuits		X		X		
Site Empty Conduits (future, telecomm)		X		X		
Site Light Pole Concrete Base		X		X		
Water and Fire Service excavation and installation	X		X			
Electric wiring (pole to transformer)						
a. conduit, wire & installation pole to transformer						Utility
b. conduit, & wire transformer to bldg		X		X		
c. transformer vault and/or pad		X		X		
d. transformer						Utility
e. generator and		X		X		

concrete pad						
Telephone / Data / Cable						
a. boxes & conduit pole to demark		X		X		
b. wire / cable pole to demark						Utility
Stormwater pipe, materials, excavation and backfill	X		X			
Sanitary pipe, materials, excavation and backfill	X		X			
Gas Service						
Excavation and backfill for new and relocated gas line	X		X			
Temporary (install)						
a. Heat before Perm. Enclosure, see section 01-5000	X		X			
a. Heat after Perm. Enclosure, see section 01-5000		X		X		
b. Electric		X		X		
c. Water		X		X		
d. water & electric use charges to substantial completion					X	

SECTION 0-2200 – UNIT PRICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 01-2600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Section 01-4000 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price 1: Removal of unsatisfactory soil and replacement with satisfactory soil material.
 - 1. None
- B. Other Unit Prices: see bid forms

END OF SECTION 01-2200

SECTION 01-2300 – ALTERNATES

PART I – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. See Bid Forms for complete information.

2. SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

3. DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

4. PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- E. Order of Alternate Selection: Owner may accept alternates in any order or cost amount.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

- 5. SCHEDULE OF ALTERNATES
- 6. GENERAL CONSTRUCTION CONTRACT
 - A. See Bid Form.
- 7. MECHANICAL CONSTRUCTION CONTRACT
 - A. See Bid Form.
- 8. ELECTRICAL CONSTRUCTION CONTRACT
 - A. See Bid Form.
- 9. PLUMBING CONSTRUCTION CONTRACT
 - A. See Bid Form.

END OF SECTION 01-2300

SECTION 01-2500 – SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01-2300 "Alternates" for products selected under an alternate.
 - 2. Section 01-6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms. Non coordinated installations will not constitute a change in project conditions.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in

substitution request, is compatible with related materials, and is appropriate for applications indicated.

- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions. The Prime requesting the substitution will be required to coordinate the change with all other prime contractors.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied,

Architect will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- b. Substitution request is fully documented and properly submitted.
- c. Requested substitution will not adversely affect Contractor's construction schedule.
- d. Requested substitution has received necessary approvals of authorities having jurisdiction.
- e. Requested substitution is compatible with other portions of the Work.
- f. Requested substitution has been coordinated with other portions of the Work.
- g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a **substantial** advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.

- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-2500

SECTION 01-2600 – CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 01-2500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" (ASI).

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests (WCPR) issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

- a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to Architect.

1.5 CHANGE ORDER PROCEDURES

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

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive (CCD) on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-2600

SECTION 01-2900 – PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01-2200 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 2. Section 01-2600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 01-3200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.

- b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date, but no later than **seven** days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703
 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

- a. Include separate line items under principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

- C. Payment Application Times: Submit Application for Payment to Architect by the last day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703. Submit forms for approval with initial submittal of schedule of values.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

- G. Transmittal: Submit one signed and notarized Application for Payment in PDF form to Architect. One copy shall include waivers of lien and similar attachments if required. Also provide Payroll Certification from the month prior.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
 5. lawfully entitled to a lien.
 6. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.

15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-2900

SECTION 01-3100 – PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 01-1200 "Multiple Contract Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
 - 2. Section 01-3200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 3. Section 01-7300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Section 01-7700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates

coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
- b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
- c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
- d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- f. Indicate required installation sequences.
- g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
2. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.

- b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 3. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit **1-1/4 inches** in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 4. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 5. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Preparation Format: DWG, Version, operating in Microsoft Windows operating system.
 3. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files. See Section 01 34 00 for more information.

- a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
- b. Digital Data Software Program: Drawings are available in AutoCAD.
- c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

- a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect

4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

- A. General: GC to Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. "Preconstruction Conference: GC to schedule, prepare agenda, create and distribute meeting minutes and conduct a Preconstruction Conference before starting construction, at a time convenient to the Owner and Architect.
1. Conduct the conference to review responsibilities and personnel assignments
 2. Attendees: Authorized representatives of Owner, Architect and their Consultants; Prime Contractors and their Project Managers and Superintendents; major subcontractors; suppliers; and other key

parties as appropriate. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work

3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative Construction schedule
 - b. Phasing
 - c. Critical Work sequencing

- d. Designation of key personnel and their duties
 - e. Lines of communication
 - f. Procedures for processing field decisions and Change Orders
 - g. Procedures for RFI's
 - h. Procedures for testing and inspections
 - i. Procedures for processing Applications for Payment
 - j. Distribution of the Contract Documents
 - k. Submittal procedures
 - l. Preparation of Record Documents
 - m. Use of the Premises
 - n. Work restrictions
 - o. Working hours
 - p. Owner's occupancy requirements
 - q. Responsibility for temporary facilities and controls
 - r. Procedures for moisture and mold control
 - s. Procedures for disruptions and shutdowns
 - t. Construction waste management and recycling
 - u. Parking and laydown areas
 - v. Office, work and storage areas
 - w. Equipment deliveries and priorities
 - x. First Aid
 - y. Security
 - z. Progress cleaning and site maintenance
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Deliveries.
 - b. Submittals.
 - c. Review of mockups.
 - d. Possible conflicts.
 - e. Compatibility requirements.

- f. Time schedules.
 - g. Weather limitations.
 - h. Manufacturer's written instructions.
 - i. Compatibility of materials.
 - j. Acceptability of substrates.
 - k. Space and access limitations.
 - l. Testing and inspecting requirements.
 - m. Installation procedures.
 - n. Coordination with other work.
 - o. Required performance results.
 - p. Protection of adjacent work.
 - q. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: GC conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule

revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
- 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation for processing pay requests
 - 19) Manpower summaries and work progress
 - 20) Status of inspections
 - 21) Status of testing
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

- E. Coordination Meetings: GC will conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.

- 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-3100

SECTION 01-3200 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

- 1. Startup construction schedule.
- 2. Contractor's construction schedule.
- 3. Construction schedule updating reports.
- 4. Daily construction reports and 2 Week Look Ahead
- 5. Material location reports.
- 6. Site condition reports.
- 7. Special reports.
- 8. Meeting minutes.
- 9. Progress photos
- 10. As-builts
- 11. Testing reports.
- 12. Commissioning and Certificate of Occupancy

- B. Related Requirements:

- 1. Division 1 Section "Multiple Contract Summary" for preparing a combined Contractor's construction schedule.
- 2. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
- 3. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
 2. PDF electronic file.
- B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
 - C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
 - D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
 - E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all activities sorted in ascending order of total float.
 - F. Construction Schedule Updating Reports: Submit with pencil copy Applications for Payment.
 - G. Daily Construction Reports: Submit at weekly intervals.
 - H. Material Location Reports: Submit at monthly intervals.
 - I. Site Condition Reports: Submit at time of discovery of differing conditions and after significant weather events.
 - J. Special Reports: Submit at time of unusual event.
 - K. Qualification Data: For scheduling consultant.
- 1.5 QUALITY ASSURANCE
- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours

of Architect's or CM's request. Consultant must have a minimum of 8+ years scheduling experience, including projects of similar value, must be proficient in resource and cost loading schedules and must have experience with time impact analysis. Submit consultant qualifications for review.

- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing, work stages, area separations, interim milestones.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review submittal requirements and procedures.
 7. Review time required for review of submittals and resubmittals.
 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 9. Review time required for Project closeout and Owner startup procedures.
 10. Review and finalize list of construction activities to be included in schedule.
 11. Review procedures for updating schedule.
- C. Should any activity, milestone or completion date be 30 days or more behind schedule, the Owner shall have the right to perform activities required to bring the Project back on schedule by whatever method the Owner deems appropriate. Costs incurred by the Owner in connection with expediting or performing construction activities shall be reimbursed to the Owner by the Contractor. Failure by the Owner to exercise their right to have the Contractor expedite activities or to expedite activities by other means shall not be considered precedent setting for any other activities.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. The Scheduling Consultant shall be a representative of the General Contractor and is responsible for developing and maintaining the schedule as outlined in the Contract Documents. All other Contractors (Prime or other) are required to fully cooperate with the Scheduling Consultant and the Project Coordinator to develop and maintain the schedule. Delays and additional costs incurred on the Project due to lack of cooperation and coordination on the part of a Contractor will be assignable by the Owner to the Contractor.

PART 2 – PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion and through to Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order. The time between the early completion date shown on the schedule and the contract completion date will be considered Float.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

6. Punch List and Final Completion: Include not more than **30** days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.

- k. Curing.
 - l. Building flush-out.
 - m. Startup and placement into final use and operation.
8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- D. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- 1. See Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
- 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use Primavera or other software approved by the CM. Provide 1 additional license for Owner/CM use for the duration of the Project.

2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 14 days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first **90** days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within **30** days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.

- a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain CM or Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by Architect and CM.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.

4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.

18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within 2 day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 – EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.

2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01-3200

SECTION 01-3233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Periodic construction photographs.
- B. Related Requirements:
 - 1. Section 01-3300 "Submittal Procedures" for submitting photographic documentation.
 - 2. Section 01-7700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.

1.3 INFORMATIONAL SUBMITTALS

- A. Digital Photographs: Submit image files within one week of taking photographs.
 - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
 - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
 - 3. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date photograph was taken.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - e. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: Site superintendent or other qualified individual.

1.5 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: ~~Engage a qualified photographer to take construction photographs.~~ **Site superintendent or other qualified individual.**
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect and Construction Manager.
- D. Periodic Construction Photographs: Take 30 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

END OF SECTION 01-3233

SECTION 01-3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Division 1 Section "Substitutions".
 - 3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 5. Division 1 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 6. Division 1 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

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

~~C.~~ Basis-of-Design: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

~~D.C.~~

~~E.D.~~ File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

~~F.E.~~ Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.

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

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals.
 - 1. Architect will furnish each Contractor requesting one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Contractor shall execute a data licensing agreement in the form of Agreement provided by the Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule. Incomplete submittals will be returned not reviewed.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: With Architect's approval submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately **6 by 8 inches** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) As directed by Architect.

- i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Use AIA Document G810.
 - b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name and address of Architect.
 - 6) Name of Contractor.
 - 7) Name of firm or entity that prepared submittal.
 - 8) Names of subcontractor, manufacturer, and supplier.
 - 9) Category and type of submittal.
 - 10) Submittal purpose and description.
 - 11) Specification Section number and title.
 - 12) Specification paragraph number or drawing designation and generic name for each of multiple items.
 - 13) Drawing number and detail references, as appropriate.
 - 14) Indication of full or partial submittal.
 - 15) Transmittal number, numbered consecutively.
 - 16) Submittal and transmittal distribution record.
 - 17) Remarks.
 - 18) Signature of transmitter.

6. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 7. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a dash and then a sequential number (e.g., G-00-0000-01-A). Resubmittals shall include an alphabetic suffix after another decimal point (e.g. G-00-0000-01-B). The beginning letter will designate the Prime Contract (G=General, M=Mechanical, E=Electrical, P=Plumbing, F=Fire Protection)
 8. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

- J. Rejected Submittals: The Architect shall not be required to make exhaustive reviews of incorrect or incomplete shop drawings and submittals. If shop drawings or submittals are returned "Rejected" or "Revise and Resubmit" 3 times then the time to review each subsequent submission will be charged to the Contractor at the Architect's hourly rates. These charges will be executed as deduct change order(s) to the Contractor's contract with the Owner, with payment remitted by the Owner to the Architect.

PART 2 – PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Action Submittals: Submit PDF of each submittal unless otherwise indicated. If the submittal is larger than 11"x17" then also provide 1 full size paper copy. Architect will return a PDF with action indicated.
 2. Informational Submittals: Submit PDF of each submittal unless otherwise indicated. Architect will not return a PDF unless requested.
 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.

- c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches** , but no larger than **30 by 42 inches**.
 3. Submit Shop Drawings in the following format:

- a. PDF file. If submittal is larger than 11"x17" then also provide 1 full size paper set
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit 2 full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit 2 sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
 5. Submit product schedule in the following format:
 - a. Three paper copies of product schedule or list unless otherwise indicated. Architect will return two copies.
- F. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

- H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- V. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 – EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 1 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01-3300

SECTION 01-3400 – COORDINATION DRAWINGS

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. Where space for installation of essential building services is limited, and to avoid conflicts among the building trades, it is necessary for the Prime Contractors to coordinate the use of “shared” space, and prepare Coordination Drawings, before commencing the Work. All Prime Contractors and their associated subcontractors, during the coordination process, shall harmoniously plan and/or adjust the location of items as necessary, to avoid such conflicts and to ensure future access to critical items of equipment. All Prime Contractors shall also coordinate the installation sequence as necessary.
- B. Coordination of the Work, and production of Coordination Drawings, are contractual obligations of all Prime Contractors and led by the Project Coordinator and Coordinators for the other Primes. The Owner will not compensate any Prime Contractor for conflicts arising during installation, should they be the result of improper coordination between Prime Contractors. Nor will the Owner extend the Contract duration, due to delays caused by improper coordination. Each Contractor shall be solely responsible to recover any and all construction time lost as a result of such delays.
- C. Coordination drawings are in addition to a separate shop drawings to be submitted at the conclusion of the coordination process by each Prime Contractor (as required by other specification sections).

1.3 SUBMITTALS

- A. Time of submission of Coordination Drawings shall be determined at the initial job conference, and shall be included as a milestone on the Construction Schedule. The

General Construction Contractor (Project Coordinator) shall initiate this action and acquire the necessary dates from the other Prime Contractors as part of their overall scheduling responsibilities.

- B. All Prime Contractor{s} shall jointly develop and submit dimensioned Coordination Drawings indicating the arrangement of General Construction, Mechanical (HVAC), Plumbing, Electrical and Fire Protection work, including but not limited to: all ducts, air-handling equipment, control equipment, piping, conduits, raceways, junction boxes, fixtures, panels, and all associated equipment, which must be coordinated with the General Construction and other equipment or distribution lines. The Coordination Drawings must be signed and dated by all Prime Contractors, indicating concurrence, and transmitted to the Project Coordinator (in accordance with the construction schedule), for submission.
- C. The Owner's receipt of Coordination Drawings does not in any way constitute approval, or relieve the Prime Contractors of the responsibility to accurately coordinate and install their work.
- D. The Project Coordinator shall submit completed, signed, and dated Coordination Drawings as follows:
 - 1. The Architect – one (1) copy of each Coordination Drawing and one (1) PDF file containing each drawing.
 - 2. Prime Contractors – one (1) copy of each Coordination Drawing and one (1) PDF file containing each drawing.
- E. Note: If determined necessary, Coordination Drawings may be formulated and submitted in partial submittals to facilitate the construction schedule and sequence of work within the Project. This must be jointly discussed and agreed to by all Prime Contractors at the initial job conference, and a priority of sequence must be established that has the concurrence of all parties (including the Owner).
- F. The Project Coordinator shall keep all coordination drawings on-site at all times and updated regularly through the entire construction duration. These drawings will become part of the as-built drawing package.

1.4 COORDINATION OF WORK

- A. Each Prime Contractor shall coordinate its construction operations with those of other Prime Contractors and entities to ensure efficient and orderly installation for each part

of the Work. Each Prime Contractor shall coordinate its operations with other operations, included in different Sections that depend on each other for proper installations, connection, and operation. All Prime Contractors shall:

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of all components with other Prime Contractors to ensure adequate accessibility/clearance for required maintenance and service.
 3. Make provisions to accommodate items scheduled for later installation.
- B. Each Prime Contractor shall clearly show, and coordinate with the other Prime Contractors, the following:
1. Arrange for pipe spaces, chases, slots, sleeves, and openings with general construction work, and arrange in building structure during progress of the Work, to allow for and facilitate distribution line and equipment installation.
 2. Coordinate installation of required supporting devices for ductwork, piping, and conduit, as well as sleeves, and other structural components, as they are constructed.
 3. Coordinate requirements for access panels and doors for HVAC, Plumbing, Fire Protection and Electrical items requiring access where concealed behind finished surfaces.
 4. Coordinate electrical connections to equipment provided by all Contractors.
 5. Sequence, coordinate, and integrate installing materials and equipment for efficient flow of the Work. Coordinate installing large items of equipment requiring positioning before closing in the building.

1.5 COORDINATION DRAWINGS

- A. Format: All Coordination Drawings shall include "X, Y & Z" coordinates for all distribution and equipment, which will allow a three-dimensional coordination plan to be created.
1. Indicate ducts, pipes and conduits of dimensions greater than 6" by double lines.

2. Circle and clearly note all deviations from the Contract Documents, with reason for deviation stated.
3. Use scale not less than $\frac{1}{4}'' = 1'-0''$. Detail complex areas at larger scale.
4. Each different system shall be drawn in a different color.
5. The MEPFP Coordinator shall prepare a title box on each drawing which allows space for the signature of the authorized individual from the Prime Contractor's firms, with the statement below:

"The undersigned individuals certify by their signatures that they have coordinated their work with all other work noted on this drawing and the contract documents and shall be held responsible for any costs arising out of their respective inability to fully coordinate their work."

B. Coordination Procedure:

1. The MEPFP Coordinator is responsible for acquiring from all the other Prime Contractors and assembling scaled coordination drawings indicating all new and existing architectural finishes, as well as the locations of all ductwork, piping, conduit, system devices, associated equipment, etc. for this Project.
2. The MEPFP Coordinator shall prepare the basic background drawings, showing the existing conditions as well as the new construction items to be installed by this Contractor. The MEPFP Coordinator may either:
 - a. Produce the required base drawings itself,
 - b. Obtain them from the Architect, at a cost not to exceed 1.2 times the cost of reproduction, or
 - c. Via e-mail, obtain electronic files from the Architect of the floor plans and reflected ceiling plans for a fee of \$250.00, payable to the Architect. A Letter of Indemnification will need to be signed by any contractor using the electronic files.
3. After producing its own background drawings or obtaining background drawings from the Architect, the MEPFP Coordinator shall put the following information on the Coordination Drawings: Architectural backgrounds, structural work, ceiling systems, and any special work, such as theatre/stage/rigging work. The Project Contractor shall call attention on the Coordination Drawings to particular areas of conflict, which may affect the architecture or the structure.

4. After adding its specific requirements to these reproducible background drawings, the MEPFP Coordinator shall place his signature on each sheet and give the Coordination Drawings to the Plumbing Contractor.
5. The Plumbing Contractor shall put the following information on the Coordination Drawings: Plumbing contract work.
6. After adding its specific requirements to these reproducible background drawings, the Plumbing Contractor shall place his signature on each sheet and give the Coordination Drawings to the Fire Protection Contractor.
7. The Fire Protection Contractor shall put the following information on the Coordination Drawings: Fire Protection Contract Work, including Sprinkler/ Fire Protection Systems.
8. After adding its specific requirements to these reproducible background drawings, the Fire Protection Contractor shall place his signature on each sheet and give the Coordination Drawings to the Electrical Contractor.
9. The Electrical Contractor shall put the following information on the Coordination Drawings: Electrical Contract Work, including fire alarm, telecommunications and security systems, major conduit runs, lighting and panel locations, and conduit embeds in floor slabs and underground.
10. After adding its specific requirements to these reproducible background drawings, the Electrical Contractor shall place his signature on each sheet and give the Coordination Drawings to the General Contractor.
11. The General Contractor shall put the following information on the Coordination Drawings: Any general construction items not shown on the coordination drawings.
12. The General Contractor shall place his signature on each sheet and give the Coordination Drawings to the next Prime Contractor (if there are other Prime Contractors not mentioned here), or otherwise return the Coordination Drawings to the Project Coordinator, for Submission to the Owner and Architect.
13. Discrepancies between the Prime Contractors shall be settled by the Project Coordinator, if no design modifications are required. Where design modifications

are required, affected Contractor(s) shall submit them to the Architect for review and resolution, or initiate a Request For Information (RFI).

14. The Prime Contractors, together, are solely responsible for the accuracy and completeness of all Coordination Drawings.
15. The MEPFP Coordinator shall lead in the resolution of the final coordination drawing to be initialed (certifying that they have met, reviewed and agreed) by all contractors and submitted to the Architect within 65 days after the start of construction for review. Other contractors shall finalize their shop drawings and submittals in accordance with the coordination drawings.

D. Distribution:

1. Upon receipt of all fully-coordinated and signed Coordination Drawings from the other Prime Contractors, the Project Coordinator shall make proper distribution, as defined above

E. Review:

1. Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

1.06 SPECIFIC REQUIREMENTS

A. General Construction/Structural Work Information Required:

1. Openings and sleeve locations required in slabs, walls, beams, and other structural elements, including required openings not indicated on the Contract Documents.
2. Slab edge locations.
3. Embed locations, as described above. Note embedded steel angles at edges of sump and sewage ejector pits, to accept basin covers.
4. Wall and chase spaces for housing HVAC, Plumbing, Fire Protection, or Electrical items.

5. All site work and utilities
 6. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
- B. HVAC Work Information Required:
1. Sizes and bottom elevations of rectangular ductwork, including angle bracing, flanges, and support systems.
 2. Sizes and centerline elevations of round ductwork, piping and conduit runs
 3. Acoustical lining in ductwork.
 4. Identification of ductwork pressure class.
 5. Dimensions of major components, such as dampers, valves, diffusers, registers, cleanouts, coils, VAV boxes, HVAC equipment, and electrical distribution equipment.
 6. Fire-rated enclosures around ductwork.
 7. Access panels required.
 8. Geothermal well field
 9. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.
- C. Plumbing and Fire Protection Information Required:
1. Sizes and centerline elevations of piping runs.
 2. Locations of plumbing valves, equipment, and fixtures.
 3. Locations of standpipes, floor control assemblies, fire hose valves, mains, piping, branch lines, pipe drops, sprinkler heads, fire pumps/controllers, and jockey pumps.
 4. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.

D. Electrical Work Information Required:

1. Runs of vertical and horizontal conduit, 1 ¼" diameter and larger.
2. Light fixture locations.
3. Exit light locations.
4. Smoke detector and other fire alarm locations.
5. Panelboards, switchboards, switchgear, transformers, busways, generators and motor control center, exit signs, and emergency battery pack locations.
6. Locations of pull boxes and junction boxes, dimensioned from column centerlines.
7. Access panels required.
8. Site electric
9. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.

E. Ceiling Systems and Plenum Space Information Required:

1. For HVAC, plumbing, fire protection, fire alarm, electrical, controls, and telecommunications Work penetrating acoustical ceilings, show locations of each item (including sprinkler heads, diffusers, grilles, access doors, light fixtures, smoke detectors, exit signs, speakers, and other visible ceiling-mounted devices) relative to the acoustical ceiling grid.
2. Locate components within ceiling plenums to accommodate layout of light fixtures indicated on Drawings. Clearly indicate areas of conflict between light fixtures and other components on Coordination Drawings.
3. Other specific/critical conditions unique to this Project, not noted above but necessary to assure proper coordination.

1.07 ORGANIZATION OF DRAWINGS

- A. Organize Coordination Drawings into a set, as follows: Floor Plans, Wall and Building Sections, Mechanical/Plumbing/Electrical Rooms, Structural Penetrations, Imbeds, Curbs, Pads, and Floor Depressions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01-3400

SECTION 01-4000 – QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
 - 1. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

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

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
 - 2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
 - 3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior laboratory mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data : For Contractor's quality-control personnel.

- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 30 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.

- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following (copies of reports must be distributed to Architect and Owner's Rep):
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect

installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- I. **Factory–Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. **Contractor responsibilities include the following:**
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site–assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality–assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.

3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow 14 days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.
- M. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 33.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform **for the Contractors use in scheduling tests**.
 2. Payment for these services will be made by Owner.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

- A. As per Township's approved testing agency list. If no list is available then testing agency must be approved by Architect and CM.

3.2 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.3 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01-4000

SECTION 01-4100 – EXTERIOR WALL CONSTRUCTION MOCK-UP

PART 1 – GENERAL

1.1 STIPULATIONS

- A. The specifications sections, " General Conditions of the Construction Contract ", "Special Conditions", and "Division 1 – General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 GENERAL

- A. The General Contractor is responsible for constructing a mock-up as follows:
 - 1. Build mockup of wall area of new construction where directed by Architect.
 - 2. Mock up of new finishes on the existing building can be installed on an area of the existing building that is satisfactory to the Owner and Architect
 - 3. All other contractors shall provide materials that penetrate the exterior wall.

1.3 QUALITY CONTROL

- A. Quality Control
 - 1. Before installing portions of the Work requiring mockups, build mockups for each form of construction and exterior finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 2. Mock-up to be constructed in 2 phases (review and approval of phase 1 to be completed prior to construction of phase 2):
 - a. Phase 1: Wall construction including studs, insulation, sheathing, exterior wall penetrations (i.e.: conduit and pipe), window, louver, concealed sealants, and dampproofing.
 - b. Phase 2: Installation of all exterior finishes (including exposed sealants).

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Construct the exterior wall mock-up, using materials specified in other Sections for the completed Work; comply with the following:

1. Materials shall be as indicated on the respective structures wall sections in the construction documents.

PART 3 – EXECUTION

3.1 MOCK-UP

- A. General: Refer to the Drawings for exterior elevation and construct wall as noted below.
 1. Build mockup of typical wall area where directed by Professional.
 - a. Construct a minimum 96 inches long by 96 inches high mock-up of the typical exterior wall including stone, EIFS, window, fascia and soffit. Architect to approve panel layout prior to construction.
 2. Clean exposed faces of mockups with masonry cleaner indicated.
 3. Coordinate mock-up review with regularly scheduled meeting date. Notify Professional in advance of the proposed mockup review date.
 4. Protect accepted mockups from the elements with weather-resistant membrane.
 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Acceptance of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Professional in writing.
 - b. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Professional in writing.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

END OF SECTION 01-4100

SECTION 01-4200 – REFERENCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.

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

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject

to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01-4200

SECTION 01-5000 – TEMPORARY FACILITIES AND CONTROLS – MULTI 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. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Division 1 Section "Multiple Contract Summary" for work restrictions and limitations on utility interruptions.
 - 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section "Execution Requirements" for progress cleaning requirements.
 - 4. Division 31 Section "Dewatering" for disposal of ground water at Project site.
 - 5. Division 32 Section "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
 - 6. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 DIVISION OF RESPONSIBILITIES

- A. General: These Specifications assign each prime contractor specific responsibilities for certain temporary facilities used by other prime contractors and other entities at the site. The Contractor for General Construction (G.C.) is responsible for providing temporary facilities and controls that are not normal construction activities of other prime contractors and are not specifically assigned otherwise by the Architect.
- B. Each prime contractor is responsible for the following:
 - 1. Permits, installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, as well as the costs and use charges associated with each facility.

2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own storage and fabrication sheds.
 4. Temporary enclosures for its own construction activities.
 5. Staging and scaffolding for its own construction activities
 4. Hoisting all of their own equipment (whether inside or outside of the building).
 5. Collection and disposal of its own hazardous, dangerous, unsanitary, or other harmful waste material.
 6. Progress cleaning of work areas affected by its operations on a daily basis.
 7. Secure lockup of its own tools, materials, and equipment.
 8. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
- C. The Contractor for General Construction is responsible for the following:
1. Dewatering facilities and drains.
 2. Temporary telephone and internet service.
 3. Temporary field offices for Contractor's personnel and Project Progress Meetings.
 4. Temporary toilets, including disposable supplies.
 5. Temporary wash facilities, including disposable supplies.
 6. Temporary enclosure of the building.
 7. General collection and disposal of wastes.
 8. Project identification sign, project acknowledgment sign, and temporary signs.
 9. Rodent and pest control.
 10. Barricades, warning signs, and lights.
 11. Temporary fence around construction site (project limits).
 12. Environmental protection.
 13. Temporary heat and humidity control prior to "enclosure" of the building.
 14. Snow removal within the project boundaries
 15. Drinking water.
- D. The Plumbing Contractor is responsible for the following:
1. Temporary water service.
 2. Temporary sewer and drainage.
- E. The Heating, Ventilating, and Air-Conditioning Contractor is responsible for the following:
1. Temporary heat & humidity control, upon "enclosure" of the building.
- F. The Electrical Contractor is responsible for the following:
1. Temporary electric power service (including power for temporary heat and power to trailers).

2. Temporary lighting.
3. Temporary site security lighting.
4. Temporary power to Owner's temporary office trailers will be by Owner.

1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Telephone, Internet and Cellular Service: General Construction Contractor will provide telecommunication systems and pay for use charges for common use field office.

1.5 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent. Conform to approved land development plans.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

3. Indicate sequencing of work that requires water, such as sprayed fire-resistant materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air-filtration system discharge.
 4. Waste handling procedures.
 5. Other dust-control measures.
- 1.6 QUALITY CONTROL
- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
 - B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
 - C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- 1.7 PROJECT CONDITIONS
- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Pavement: Comply with Division 32 Section "Hot-Mix Asphalt Paving."

- B. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches .
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- F. Signs:
 - 1. Project Identification Sign:
 - a. The Architect will provide the General Contractor with a digital file for a 4'x6' project sign. The GC will have the sign manufactured and installed within 30 days of the Notice to Proceed. The General Contractor is responsible to maintain the sign in good condition. The General Contractor will move and reinstall the sign if it is in conflict with work at the site. The General Contractor will be responsible to replace the project sign if damaged.
 - b. Small company signs for the GC, MC, EC and PC may be erected with the approval of the Owner and Architect. All other company signs are prohibited.
 - c. The General Contractor will provide any other signs that may be required by US, State or Local government.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are legible at all times.
 - 4. Unauthorized signs are not permitted.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Each prime contractor is to provide its own office and storage trailers as required.

- B. Common-Use Field Office: GC to provide a trailer of sufficient size to accommodate needs of Owner, Architect, and General Contractor's construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 2. Conference room of sufficient size to accommodate meetings of 12 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
 3. Drinking water.
 4. Coffee machine and supplies.
 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F
 6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 3. Permanent HVAC System: If Owner and Architect authorize the use of permanent HVAC system for temporary use during construction (for either heating or humidity control), provide filter with MERV of 8 at each return-air grille in system and remove at end of construction. Clean HVAC system and replace all filters as required in Division 01 Section "Closeout Procedures." HVAC system warranties, regardless of

whether they are used or not during construction, will start when the Certificate of Substantial completion is issued by the Architect.

- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

- E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- H. Concrete Moisture Content: The General Contractor is responsible to provide concrete slabs with moisture content that is acceptable and compatible with selected floor finishes. This can be accomplished by the use of fans, dehumidification systems or sealers (if compatible with final floor finishes). The cost of this work is included with the construction contract. The use of permanent HVAC systems is not considered an acceptable way to dry out concrete slabs.
- I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
- J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Install lighting for Project identification sign.
- K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 TEMPORARY HEAT

- A. General: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- B. The temporary heat requirements on this project are divided into two (2) categories, i.e., (1) temporary heat required prior to the enclosure of the building, buildings, or portions thereof; (2) temporary heat required subsequent to the enclosure of the building, buildings or portions thereof.
- C. A building or portion thereof shall be considered to be "enclosed" when (a) the roof is on and tight; (b) the exterior walls have been constructed with studs, sheathing, building paper (or wrap), and insulation; and (c) when openings, doors and windows are closed with permanent closures or with substantial temporary closures of tarpaulins attached with battens which will affect the retention of heat within the building or portion thereof.

- D. Prior to enclosure of building, buildings or portions thereof, and when official local weather predictions indicate below freezing temperatures or temperatures that may damage the work, the General Construction Contractor shall provide, maintain, operate and pay all costs, including fuel, for a sufficient number of approved portable heaters so that the progress of its work is not impeded, and proper protection of its work from freezing is maintained. Self-contained oil-fired portable heaters, if used, must be vented to the outside of the enclosed structure. Oil-fired heaters shall be used only in areas where finish work has not started.
- E. After the building, buildings or portions thereof are enclosed, and temporary heat is required for proper construction, the HVAC Contractor shall provide, maintain, operate and pay all costs, including fuel, for a sufficient number of approved portable heaters so that the progress of its work is not impeded, and proper protection of its work from freezing is maintained. The HVAC Contractor may, with the Architect and Owner's approval, utilize the permanent system or portions thereof or may install temporary steam or hot water radiation or convectors or a combination of both.
- F. Temporary heating system as hereinafter noted, shall be of sufficient capacity to heat the interior of the building to 60°F, when outside temperature is 0°F. Temperature at all times must be 60°F, or above. This service shall be continued until the entire project is completed, except as hereinafter noted.
- G. Where electricians or plumbers are required to install, operate supervise or maintain equipment used in the provisions of temporary heat, the payment of the services of such personnel shall be the responsibility of the Electrical and the Plumbing Contractors respectively. It will be the responsibility of the Electrical and Plumbing Contractors to coordinate with the HVAC Contractor for temporary heat.
- H. The G.C. shall remove all soot, smudges, and other deposits from walls, ceilings and exposed surfaces which are the result of the use of any temporary heating equipment after enclosure, including the use of the permanent heating system for temporary heating purposes. No finish work shall start until all such surfaces are properly cleaned.
- I. All permanent heating equipment used to supply temporary heat shall be completely cleaned and reconditioned by the HVAC Contractor, prior to final acceptance, in the presence of the Owner personnel. HVAC contractor shall also replace all filters. All permanent heating equipment such as radiator trap seats and diaphragms, valve sets and discs, strainer internals or any other equipment found to be damaged due to being used for temporary heat shall be replaced. The HVAC Contractor shall pay for all replacement parts and labor.
- J. The use of temporary electric-resistance heating will not be permitted for temporary heat. Where electric-resistance heating is specified as part of the permanent heating system it may not be used for temporary heat.

- K. The total cost of temporary heat shall be made a part of the lump sum bid submitted by each Contractor. The cost of temporary heat after enclosure shall be shown as the last item on the HVAC Contractor's Application for Payment, Schedule of Values and shall include the number of calendar days, cost per twenty-four (24) hour day and extended price. Any adjustment to the number of days of temporary heat, used or not used, will be based on this unit price. The HVAC Contractor shall include 90 days of temporary heat in its bid.

3.4 HUMIDITY CONTROL

- A. The contractor requiring humidity control for the installation of their work shall provide humidity control.

3.5 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas for access for equipment adequate for construction operations. Locate temporary roads and paved areas as required for construction equipment. Provide binder course paved access from the main entry to the building for emergency vehicle access by no later than the start of structure erection.

- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."
 5. G.C. shall be responsible to maintain clean egress to/from site and shall expeditiously clean up any debris.
 6. G.C. is responsible for all snow removal within the project boundaries.
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Coordinate with the Owner for parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- G. Signs:
1. Signs will be fabricated and installed by the GC at a location designated by the Owner and Architect.
- H. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 1 Section "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

M. Staging: Furnish, erect, and maintain in safe condition all exterior and interior staging and scaffolding required to properly carry out and complete the work.

1. Staging and Scaffolding shall comply in all respects to the governing laws and codes.

N. Temporary Use of Elevator: For temporary use of elevator equipment prior to final completion and final acceptance, make necessary arrangements with elevator installing firm, subject to approval of Owner and Architect and governing code compliance. Reimburse elevator installing firm for labor and materials that are not part of permanent installation and that are required to provide temporary elevator service, including, but not limited to:

1. Temporary car enclosures.

2. Guards or other protection for elevator machine room and hoistway openings.

3. Main line switch with wiring.

4. Necessary power, signaling devices, and lights in car.

5. Testing and obtaining special permits or certificates.

6. Sign elevator installing firm's temporary acceptance form before any elevator is placed into temporary service.

7. Pay costs of power and operation, including maintenance of equipment.

3.6 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: Entire building area to be enclosed. Any additional fence required for an enlarged construction area will be provided and paid for by the GC.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner and Owner's Representative.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.7 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.

- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.

2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control building humidity. Use of permanent HVAC systems is not considered an adequate way of reducing the moisture content in concrete slabs.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.8 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 01-5000

SECTION 01-5639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

- A. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.

1.4 INFORMATIONAL SUBMITTALS

- A. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- B. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- C. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.5 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA, licensed arborist in jurisdiction where Project is located, current member of ASCA, or registered Consulting Arborist as designated by ASCA.

1.6 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Moving or parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Backfill Soil: Stockpiled soil mixed with planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
1. Mixture: Well-blended mix of two parts stockpiled soil to one part planting soil.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
1. Type: Shredded hardwood.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements: Previously used materials may be used when approved by Architect.
1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts; with 1-5/8-inch- (42-mm-) OD top rails and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - a. Height: 48 inches.
 2. Plywood Protection-Zone Fencing: Plywood framed with four 2-by-4-inch (50-by-100-mm) rails, with 4-by-4-inch (100-by-100-mm) preservative-treated wood posts spaced not more than 96 inches (2400 mm) apart.
 - a. Height: 48 inches.

3. Wood Protection-Zone Fencing: Constructed of two 2-by-4-inch (50-by-100-mm) horizontal rails, with 4-by-4-inch (100-by-100-mm) preservative-treated wood posts spaced not more than 96 inches (2400 mm) apart, and lower rail set halfway between top rail and ground.
 - a. Height: 48 inches.
 4. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart. High-visibility orange color.
 - a. Height: 48 inches.
 5. Gates: Swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

3.2 PREPARATION

- A. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- B. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected areas except by entrance gates.
 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.

3. Access Gates: Install as directed by Architect.

- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Do not allow exposed roots to dry out before placing permanent backfill.

3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 3. Cover exposed roots with burlap and water regularly.
 - 4. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.
 - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.

2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).

B. Cut branches with sharp pruning instruments; do not break or chop.

C. Do not paint or apply sealants to wounds.

D. Chip removed branches and dispose of off-site.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
2. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 2-inch uniform thickness to remain.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01-7300 – EXECUTION

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. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

- 1. Construction layout.
- 2. Field engineering and surveying.
- 3. Installation of the Work.
- 4. Cutting and patching.
- 5. Coordination of Owner-installed products.
- 6. Progress cleaning.
- 7. Starting and adjusting.
- 8. Protection of installed construction.
- 9. Correction of the Work.
- 10. Final cleaning

- B. Related Requirements:

- 1. Division 1 Section "Summary" for limits on use of Project site.
- 2. Division 1 Section "Submittal Procedures" for submitting surveys.
- 3. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
- 4. Division 2 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor or professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- F. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's

aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable design requirements Section.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of **96 inches** in occupied spaces and **90 inches** in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
 - I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
 - J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage

elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing

the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F .
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
 - C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
 - E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
 - F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
 - G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls." And Division 01 Section "Construction Waste Management and Disposal."
 - H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 - I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - J. Limiting Exposures: Supervise construction operations to 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.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01-7300

SECTION 01-7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous construction waste.
 - 2. Disposing of nonhazardous construction waste.
- B. Related Requirements:
 - 1. Section 01-1200 "Multiple Contract Summary" for coordination of responsibilities for waste management.
 - 2. Section 04-2000 "Unit Masonry" for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 25 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

- 1. Construction Waste:

- a. Masonry and CMU.
- b. Lumber.
- c. Wood sheet materials.
- d. Wood trim.
- e. Metals.
- f. Roofing.
- g. Insulation.
- h. Carpet and pad.
- i. Gypsum board.
- j. Piping.
- k. Electrical conduit.
- l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste,. Include the following information:

- 1. Material category.
- 2. Generation point of waste.
- 3. Total quantity of waste in **tons** .
- 4. Quantity of waste salvaged, both estimated and actual in **tons** .
- 5. Quantity of waste recycled, both estimated and actual in **tons** .
- 6. Total quantity of waste recovered (salvaged plus recycled) in **tons** .
- 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

- B. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

- C. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01-3100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

- 1. Review and discuss waste management plan including responsibilities of waste management coordinator.

2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Use Form CWM-1 for construction waste. Include estimated quantities and assumptions for estimates.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 1. Comply with operation, termination, and removal requirements in Section 01-5000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: GC's site superintendent to be the waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01-7419

SECTION 01-7700 – CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Division 1 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Division 1 Section "Execution" for progress cleaning of Project site.
 - 3. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Division 1 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 5. Division 1 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 6. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 1 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Divisions 2 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Divisions 2 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

- a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
5. Submit test/adjust/balance records.
 6. Submit sustainable design submittals required in Division 1 sustainable design requirements Section and in individual Division 2 through 33 Sections.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 1 Section "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A or other form approved by Architect.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect will return annotated file.
 - b. PDF electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive **8-1/2-by-11-inch** paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 – EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.

- e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Power wash building exterior if requested by Architect. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 1 Section "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Division 1 Section "Temporary Facilities and Controls." And Division 1 Section "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01-7700

SECTION 01-7823 – OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Division 1 Section "Multiple Contract Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
 - 2. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 3. Division 1 Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 4. Division 1 section "Close Out Procedures"
 - 5. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
1. Architect and engineers will comment on whether content of operations and maintenance submittals are acceptable.
 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 2. 2 paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and engineers will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 – PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.

6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.

5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.

4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.

4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.

4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 – EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01-7823

SECTION 01-7839 – 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. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 2 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and one of file prints.
 - 3) Submit record digital data files and one set(s) of plots.

- 4) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
- b. Final Submittal:
 - 1) Submit 1 paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and 1 set(s) of prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
 - c. Final Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit record digital data files and 1 set(s) of record digital data file plots.
 - 3) Plot each drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.
1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Work Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as paper copy.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 – EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project. Submit updated record drawings to CM on a monthly basis for recording.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office 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, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01-7839

SECTION 01-7900 – DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Requirements:
 - 1. Divisions 2 through 33 Sections for specific requirements for demonstration and training for products in those Sections.
- C. Furnish demonstration and training instruction time as necessary at no additional cost to the Owner.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: Individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 – PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to

master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.

- f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01-7900

SECTION 02-1000 GEOTECHNICAL REPORT

*Providing Innovative Solutions to
Subsurface Problems Since 1985*



**REPORT OF
PRELIMINARY GEOTECHNICAL EXPLORATION**


**WEST BRADFORD TOWNSHIP BUILDING ADDITIONS & RENOVATIONS
1385 CAMPUS DRIVE
WEST BRADFORD TOWNSHIP, CHESTER COUNTY, PA**

PREPARED FOR

**WEST BRADFORD TOWNSHIP
1385 CAMPUS DRIVE
DOWNINGTOWN, PA 19335**

**PROJECT 5201G1R1
May 8, 2020**

**DAVID BLACKMORE AND ASSOCIATES, INC.
3335 WEST RIDGE PIKE
POTTSTOWN, PENNSYLVANIA 19464
(610) 495-6255**


Mr. Matthew Uhrig, PE
Geotechnical Engineer



Joseph Hughes
President

TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY	4
1. INTRODUCTION	5
2. PROPOSED CONSTRUCTION	5
3. GEOTECHNICAL EXPLORATION	6
4. GEOTECHNICAL BACKGROUND	6
4.1 SITE DESCRIPTION	6
4.2 GEOLOGY	7
4.3 SOILS	8
5. LABORATORY TESTING	8
6. SUBSURFACE CONDITIONS	8
7. GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS	9
7.1 SITE PREPARATION	9
7.2 FOUNDATIONS	10
7.2.1 SEISMIC SITE COEFFICIENT	11
7.3 SLAB ON-GRADE	11
7.4 BACKFILL OF FOUNDATION AND UTILITY TRENCHES	12
7.5 PAVEMENTS AND WALKWAYS	12
7.6 FILL AND COMPACTION CRITERIA	13
7.7 LATERAL EARTH PRESSURES - RETAINING WALLS	14
8. QUALITY CONTROL	14
9. LIMITATIONS	15

FIGURES AND TABLES

FIGURE I: *SITE LOCATION*

FIGURE II: *GEOLOGY*

FIGURE III: *SOILS*

TABLE I: *LABORATORY TEST RESULTS*

TABLE II: *APPROXIMATE DENSE WEATHERED ROCK ELEVATIONS*

TABLE III: *COMPACTION CRITERIA*

APPENDIX

SOIL PARTICLE SIZE ANALYSIS RESULTS
SOIL PLASTIC AND LIQUID LIMIT TEST RESULTS
TEST BORING LOGS
BORING LOCATION PLAN

EXECUTIVE SUMMARY

Purpose

This geotechnical exploration was completed to evaluate the subsurface conditions and their effect upon the proposed site development. This exploration focused on the proposed single-story addition to the west side of the West Bradford Township Building to accommodate a public meeting room and adjacent conference room and a smaller addition to the east side of the existing building adjacent to the partial basement level.

Scope

A total of seven (7) borings were completed to a maximum depth of 20.42 feet below existing grade at the subject site within the accessible areas of the proposed addition areas. Test borings B1 through B5 were completed within the larger, western “Phase 1” addition and borings B6 and B7 were completed within the smaller, eastern “Phase 2” addition. The test locations were determined and field located using Conceptual Plan prepared by Kimmel Bogrette Architecture dated January 22, 2020. The test borings were drilled by our subcontractor, **The Corcoran Drilling Company**, under the direction of DBA personnel.

A copy of the site plan used for our exploration which has been annotated with our test boring locations is included in the appendix of this report.

Findings

The results of our exploration indicate a fairly consistent subsurface profile across the subject site. **Existing fill** was encountered only in test boring B6, extending to a depth of 2.7 feet below existing grade. This boring was completed immediately adjacent to the basement level portion of the existing structure; therefore, it is anticipated that this material is related to basement wall backfill. The proposed addition at this portion of the site will match the existing basement level elevation; therefore, this material will be removed during basement excavation.

The native soil profile consists of orange brown and brown fine sand and silt with some clay, phyllite and quartz fragments (Stratum I) that is underlain by a moderately dense to dense layer of multi-colored weathered phyllite (Stratum II). Portions of the upper 2 to 4 feet of the Stratum I soils were noted to be relatively moist and loose. Where this condition is encountered within the proposed building footprint, it shall be removed and replaced with *structural fill*. Refer to Section 7.2 – Foundations and Section 7.3 – Slab On-Grade for additional information.

Recommendations:

Overall, the site conditions at the subject site are considered suitable for the support of the proposed structure on a shallow foundation system, provided that the recommendations contain herein are followed.

1. INTRODUCTION

David Blackmore and Associates, Inc. (DBA) has completed the Geotechnical Exploration of the subject site in accordance with our Proposal 5201G1P1, dated February 4, 2020. This exploration was completed to evaluate the existing subsurface conditions and their effect upon the proposed site development. Specifically, DBA has provided recommendations regarding the following:

- Foundation support of the structure and slabs, including soil bearing pressures, bearing elevations, foundation design recommendations, and anticipated settlement for shallow foundations,
- Relative elevations of surface and subsurface features,
- Fill and compaction criteria,
- Pavements and floor slabs,
- Seismic site coefficient,
- Lateral earth pressures for retaining walls, and
- General geotechnical related construction procedures.

The following section (2. PROPOSED CONSTRUCTION) summarizes the information available to DBA regarding the proposed site development. This report has been prepared based on the proposed construction. Changes to the proposed construction may require alterations to this report or additional investigative work. DBA should be notified of significant changes to the proposed construction.

2. PROPOSED CONSTRUCTION

The proposed construction consists of a single-story addition to the existing West Bradford Township Building to accommodate a public meeting room and adjacent conference room. The finished floor of this “Phase 1” addition will match that of the existing structure of 403.55 feet. In addition, a smaller addition is proposed at the east end of the existing structure, adjacent to a partial basement level. This “Phase 2” addition will match the basement level elevation of 393.47 feet. Based on the anticipated construction and in order to develop the following scope of work, DBA has

assumed that the maximum anticipated column loads shall not exceed 150 kips and the anticipated wall loads shall be on the order to 2 to 4 kips per lineal foot.

3. GEOTECHNICAL EXPLORATION

A total of seven (7) borings were completed to a maximum depth of 20.42 feet below existing grade at the subject site within the accessible areas of the proposed addition areas. Test borings B1 through B5 were completed within the larger, western “Phase 1” addition and borings B6 and B7 were completed within the smaller, eastern “Phase 2” addition.

The test borings were located in the field by DBA personnel using a Conceptual Plan prepared by Kimmel Bogrette Architecture dated January 22, 2020. The test borings were drilled by our subcontractor, **The Corcoran Drilling Company**, under the direction of DBA personnel.

All test boring logs and a test boring location plan are included in the appendix of this report.

4. GEOTECHNICAL BACKGROUND

4.1 SITE DESCRIPTION

The subject site is located on the property of the existing West Bradford Township Building located at 1385 Campus Drive in West Bradford Township, Chester County, PA. The township building located at the northwest quadrant of the property, and there are three (3) maintenance garage/ancillary buildings located within the eastern half of the site. The western addition is located within a sparsely wooded portion of the site that borders the west and north of the site. The topography is relatively flat gently sloping down from a high point at the northwest corner of the site with an elevation of approximately 405 feet to an elevation of approximately 400 feet at the southeast/east boundary of the property.

A photocopy of the USGS Topographical Map, Unionville Quadrangle, indicating the site is included as Figure I.

4.2 GEOLOGY

Available geological sources indicate the site is underlain by the Wissahickon Albite-Chlorite Schist Formation (Xwc) and adjacent to a Diabase intrusion (Trd).

Wissahickon Albite Chlorite Schist Formation (Xwc): This formation is coarsely crystalline and excessively micaceous. Bedding is fissile to thin and steeply dipping with a platy fracture pattern that is well developed, highly abundant, widely spaced and open. It is often highly weathered when exposed resulting in uneven, hackly and small sized platy fragments. Excavation is moderately easy in the weathered portions but difficult in the unweathered rock. **This formation was encountered in all test borings completed.**

Diabase Formation (Trd): This is described as a vertical volcanic intrusion sheets that are 5' to 100' thick and are dark to black, dense and very fine grained. It consist of 90% to 95% labradorite and augite. Fracture joints have a blocky pattern, well developed, regularly spaced, open and steeply dipping. It is highly resistant to weathering and shallow weathering is exhibited by large boulders mixed with a thin mantle. **This formation was not encountered in our test borings completed but is mapped immediately east of the proposed addition.**

A photocopy of the USGS Geological Map, Unionville Quadrangle, indicating the site is included as Figure II.

4.3 SOILS

The USDA Web Soil Survey records indicate the site soils to be of the following series:

Glenelg silt loam, 3 to 8 percent slopes (GgB): this is described as residuum derived from mica schist found on slopes and summits of hills. The upper 8" is a silt loam and the underlying 30" is described as a clay loam which is underlain by a channery sandy loam. It is mapped for the entire subject site.

A photocopy of the USDA Web Soil Survey indicating the site is included as Figure III.

5. LABORATORY TESTING

Representative soil samples taken during the field exploration were tested in DBA's laboratory for basic engineering properties. The laboratory testing consisted of classification of soil samples for engineering purposes. The laboratory testing included Particle Size Analysis (ASTM D442), Plastic and Liquid Limits (ASTM D4318), and Natural Moisture Content (ASTM D2216). The Unified Soil Classification System (USCS) was used to assign group symbols and group names to the soils tested.

A summary of the test results is provided in Table I. A photocopy of the particle size analysis results and the plastic and liquid limit analysis results are included in the appendix of this report.

6. SUBSURFACE CONDITIONS

The results of the drilling program revealed a fairly consistent subsurface profile.

The following strata, beneath 6" to 10" of topsoil, can describe a typical soil profile.

Stratum IF: 1.7' thick; EXISTING FILL consisting of orange brown and brown micaceous fine sand and silt with some phyllite fragments. This stratum was encountered east of the existing building in test boring B6. This fill likely represents the backfill of the existing structure's basement wall.

Stratum I: 3.4' to 6.7' thick; orange brown fine sand and silt with phyllite and quartz fragments. This stratum is considered to be loose to medium dense with SPR¹ values ranging from 5 blows per foot (B/F) to 21 B/F. The average SPR value for this stratum was 12 B/F. This stratum was encountered in each of the test borings completed.

Stratum II: 12.17' to more than 14.8' thick; multi colored weathered phyllite. This stratum is considered to be dense to very dense with SPR values ranging from 12 B/F to 50 blows over 1". The average SPR value for this stratum is 75 B/F. This stratum was encountered in each of the test borings completed.

Bedrock: Phyllite bedrock, evidenced by auger refusal was not encountered in test borings completed. However, dense weathered rock, evidenced by augering difficulty and spoon refusal was encountered at depths ranging from 10' to 15' below existing grade. Refer to Table II for Weathered Rock Elevations for the depths and elevations at which dense weathered rock was encountered at each of the test boring locations.

Groundwater²: Groundwater was not encountered in any of the test borings completed.

7. GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

The results of our exploration indicate a fairly consistent subsurface profile across the subject site. **Existing fill** was encountered only east of the existing building, in test boring B6, extending to a depth of 2.7 feet below existing grade. This boring was completed immediately adjacent to the basement level portion of the existing structure; therefore, it is anticipated that this material is related to basement wall backfill. The proposed addition at this portion of the site will match the existing

¹ SPR = the Standard Penetration Resistance or number of blows required of a 140-pound hammer dropping 30", to drive a 2" OD split spoon sampler one foot.

² The groundwater information provided is based on conditions encountered during the drilling program. Seasonal fluctuations in the groundwater table are to be expected.

basement level elevation; therefore, this material will be removed during basement excavation.

The native soil profile consists of orange brown and brown fine sand and silt with some clay, phyllite and quartz fragments (Stratum I) that is underlain by a moderately dense to dense layer of multi-colored weathered phyllite (Stratum II). Portions of the upper 2 to 4 feet of the Stratum I soils were noted to be relatively moist and loose. Where this condition is encountered within the proposed building footprint, it shall be removed and replaced with *structural fill*. Refer to Section 7.2 – Foundations and Section 7.3 – Slab On-Grade for additional information.

The site conditions at the subject site are considered suitable for the support of the proposed structure on a shallow foundation system, provided that the recommendations contain herein are followed.

7.1 SITE PREPARATION

All deleterious materials including topsoil, root mass, trees and vegetation, asphalt and other materials determined in the field by the Geotechnical Engineer to be unsuitable shall be removed from all structural areas (buildings, pavements, and walkways) prior to placement of *structural fill*. Recycling of the asphalt and underlying stone can be accomplished on site if the asphalt is milled to a maximum 1-inch particle size and the material is used in the upper fill zones of pavement areas only. This fill is not suitable for other structural areas.

7.2 FOUNDATIONS

Foundations shall bear on the undisturbed dense soils of Stratum I, Stratum II or on *structural fill*. Foundations shall NOT bear on the existing fill material of Stratum IF. Soft conditions, such as those encountered in the upper 4 feet of Stratum I in borings B2, B3, and B7, encountered during foundation construction

shall be excavated and replaced with structural fill. Refer to Section 7.7, Fill and Compaction Criteria.

Foundations shall be designed for a maximum soil bearing capacity of 3 KSF on Stratum I, Stratum II, or *structural fill*. If the column loads are to be revised during a re-design of the structure then the bearing capacity of the soils may have to be subsequently modified. DBA shall be notified of any significant changes in this regard.

Foundation settlements for the bearing capacities provided herein are to be within a tolerance of 1" total and 0.5" differential. It is anticipated that the bulk of this settlement will take place during the construction period. Settlements of this magnitude are within normal construction tolerances. In the event more stringent settlement tolerances are required a reduction of the allowable bearing capacity and/or a change in depth to bearing strata may be required.

Exterior foundations or foundations in unheated areas shall be provided a minimum of 36" compacted soil cover above the footing bottom for frost protection.

It is imperative that full-time Quality Control services are provided for all Geotechnical phases of this project.

7.2.1 SEISMIC SITE COEFFICIENT

A review of Section 1613.5.5 of the International Building Code (IBC 2018 edition)/ASCE 7 and the existing soil profile indicates that a site class C should be used in the design of the proposed structure for seismic load resistance.

7.3 SLAB ON-GRADE

The proposed finish floor elevation for the western, "Phase 1" addition of 403.55 feet compared to the existing topography indicates that up to 0.5 feet of fill and cuts of up to 2.3 feet will be required to achieve the proposed building grade. The

basement floor elevation of 393.43 feet for the eastern, “Phase 2” addition indicates that a 10 to 11-foot-deep excavation will be required within this addition footprint. Comparing these grades to test boring information, the basement excavation is not anticipated to encounter dense weathered rock.

Prior to the placement of fill within the proposed building footprint, the exposed slab subgrade areas shall be proofrolled with a heavy smooth drum roller (minimum 12-ton static weight) to detect the presence of loose or soft zones. This proofrolling operation shall be performed in the proposed fill areas under the supervision of the Geotechnical Engineer. Proofrolling of the subgrade shall also be performed in cut areas when the required grades have been achieved and immediately prior to pouring the floor slab. Loose or soft zones detected during the proofrolling operation shall be repaired to the satisfaction of the Geotechnical Engineer.

All slab subgrade areas shall be evaluated by the Geotechnical Engineer prior to pouring the slab so that repair can be completed. It is recommended that the slab be poured under roof during periods of harsh weather.

A smooth drum roller shall be made available to seal the subgrade in the event of predicted precipitation.

7.5 BACKFILL OF FOUNDATION AND UTILITY TRENCHES

All foundation and utility trenches shall be backfilled with *structural fill*, under the supervision of a Geotechnical Engineer (Refer to Section 7.7, Fill and Compaction Criteria).

7.6 PAVEMENTS AND WALKWAYS

Pavement and sidewalk areas shall be prepared in a manner similar to the slab on-grade areas. A minimum of 8 inches of crushed aggregate base shall be used beneath exterior pavements due to the frost heave potential of the subgrade soils. The pavement subgrade shall be graded to drain water from beneath the

pavement system to prevent ponding and subsequent pumping of silty subgrade soils.

For pavement design a preliminary estimated California Bearing Ratio (CBR) Value of 5.0 may be used for stabilized subgrade areas consisting of on-site fine sand and silt of Stratum II, Stratum III or Structural fill selected and placed in accordance with Section 7.7 of this report. Should anticipated heavy duty pavement requirements or other project conditions require final site specific CBR values DBA can complete field and/or laboratory CBR testing of proposed subgrade soils at the client's request.

7.7 FILL AND COMPACTION CRITERIA

Fill supporting slabs, pavements, and foundations is considered herein to be *structural fill*. *Structural fill* shall be placed on an approved, proofrolled, nonyielding, level subgrade, in lifts not exceeding 8 inches (loose thickness), unless otherwise directed by the Geotechnical Engineer. *Structural fill* shall be maintained nominally at *Optimum Moisture Content* (ASTM D-698) and uniformly compacted to the percentages of *Maximum Dry Density* (ASTM D-698) provided in Table III - Compaction Criteria.

Suitable *structural fill* shall consist of clean soils without deleterious inclusions. On-site soils identified as *Stratum I* and *Stratum II* are acceptable for use as *structural fill* if given the opportunity to dry and the soils are maintained nominally at *Optimum Moisture Content*.

Borrow fill shall be clean well-graded soils with good strength characteristics with a maximum particle size of 3 inches and containing not more than 20% silt/clay (by weight). Samples of on-site or borrow sources of fill shall be submitted to the Geotechnical Engineer for testing at least 1 week before use on site. A minimum of 65 lbs. or two (2) five-gallon buckets is required for testing.

7.8 LATERAL EARTH PRESSURES - RETAINING WALLS

The retaining walls of the structure, if proposed, should be designed for an at rest condition (K_o). The foundations and walls must be fully drained to relieve potential hydrostatic pressure. A foundation/wall drainage system is recommended. Soil backfill around the basement walls shall be well compacted and should consist of granular soils to prevent the trapping of water.

Retaining walls outside the structure which are free to rotate should be similarly designed except with an active earth pressure as opposed to K_o condition. Soil parameters used to establish the effective fluid pressures (excluding hydrostatic loads) and some additional parameters which may be used in the design of a retaining wall system are summarized in the following table:

SOIL PROPERTIES FOR DETERMINATION OF LATERAL LOADS

Parameter	Stratum I	Stratum II
Angle of Internal Friction, ϕ	28 degrees	30 degrees
Moist unit weight, γ_m	120 pcf	120 pcf
Active Earth Pressure Coefficient, K_a	0.36	0.33
Passive Earth Pressure Coefficient, K_p	2.77	3.03
At Rest Earth Pressure Coefficient, K_o	0.53	0.50
Soil/Mass concrete interface friction Angle, δ	22 degrees	24 degrees

8. QUALITY CONTROL

This report was prepared to provide design criteria for the design team. DBA assumes that Geotechnical and Construction Quality Control Services will be provided in order to implement the recommendations provided herein and to identify unanticipated or changed conditions. The Geotechnical Engineer's representative

should review the consistency and texture of the exposed soils with the conditions encountered by this exploration as described herein. Since localized loose and yielding subgrade conditions may be encountered between test locations, provisions for the undercutting and subsequent replacement of these materials should be anticipated in the construction documents. The environmental quality of the subgrade soils was not reviewed as part of this evaluation. All materials generated by grading and excavation shall be managed in accordance with regulatory requirements.

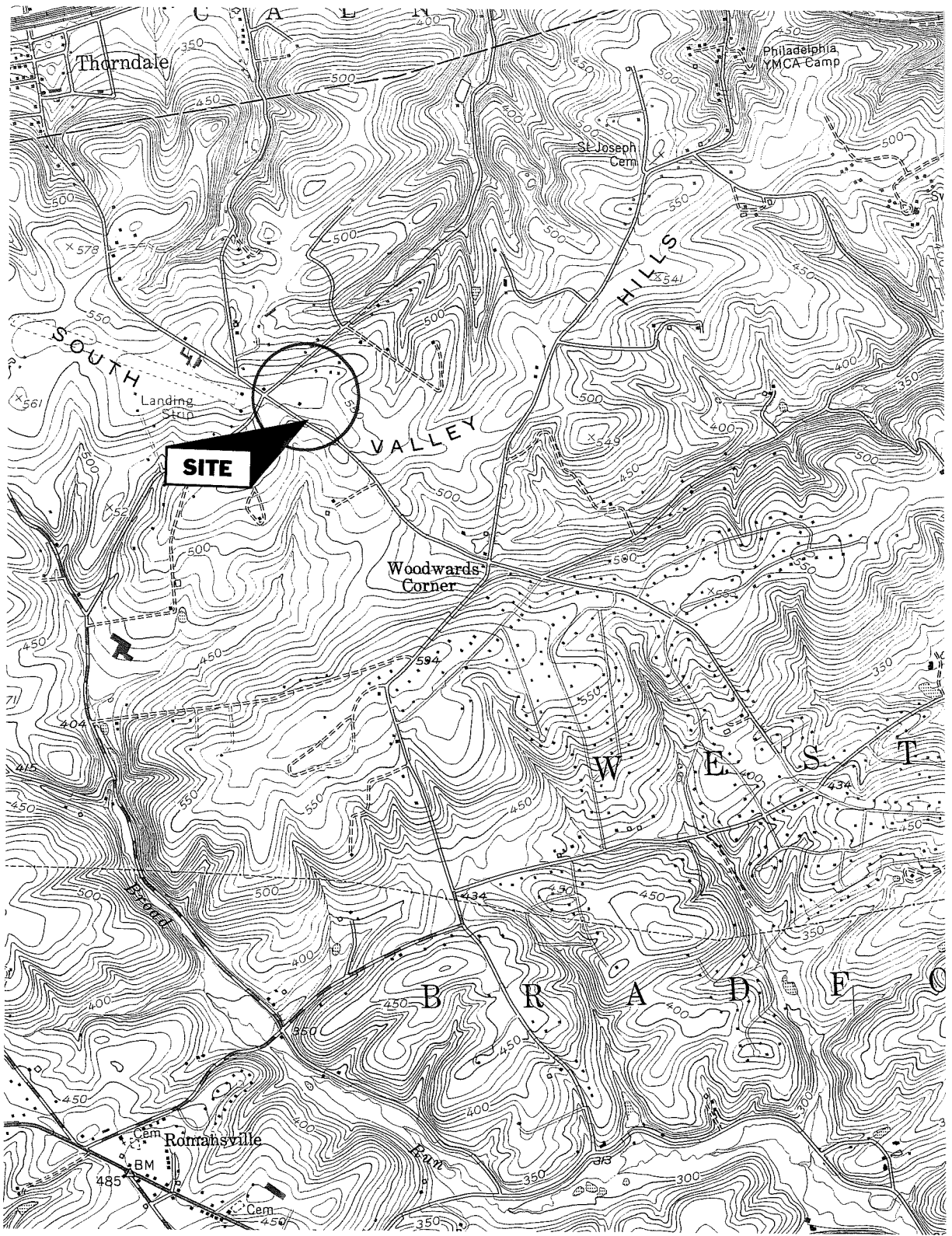
DBA can provide a contract for Geotechnical and Construction Quality Control Services (Special Inspections), as required. A pre-work meeting with the design professionals, contractors, and the Geotechnical Engineer is strongly recommended.

9. LIMITATIONS

Services performed by DBA, including the Geotechnical Exploration, report, and any subsequent construction monitoring have been or will be conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other warranty or guarantee is indicated or intended in this report or any opinion, document or otherwise stated.

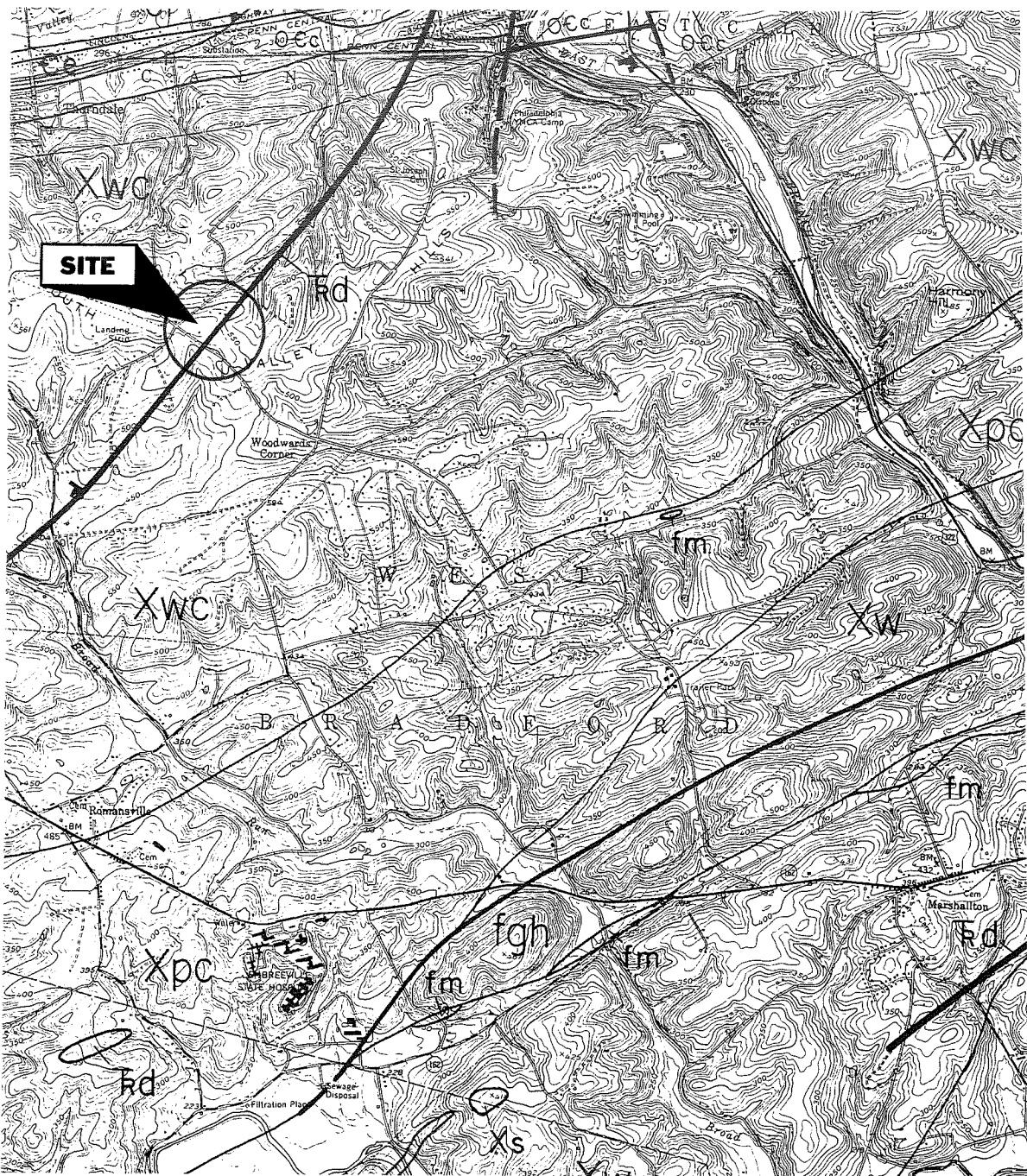
The recommendations included herein are based on the conditions encountered by the test borings performed at the subject site. It is noted that, although soil quality has been inferred from the interpolation of the site sampling data, subsurface conditions beyond the test borings are, in fact, unknown. As a result, these recommendations may require modifications based on the conditions encountered and exposed during construction excavation. Should any conditions encountered during construction differ from those described in the report, this office should be notified immediately in order to review and possibly modify the recommendations included in this report.

FIGURES AND TABLES



GEOTECHNICAL & ENVIRONMENTAL ENGINEERS
DAVID BLACKMORE & ASSOC., INC.
 3335 West Ridge Pike
 Pottstown, Pennsylvania 19464
 Telephone: (610) 495-6255 FAX: (610) 495-7353

Project 5201G1
Figure I
SITE LOCATION & TOPOGRAPHY
 U.S.G.S. 7.5 Minute Topographic Quadrangles
 Unionville Quadrangle



KEY

Xwc - Wissahickon Formation, albite-chlorite schist

GEOTECHNICAL & ENVIRONMENTAL ENGINEERS
DAVID BLACKMORE & ASSOC., INC.
 3335 West Ridge Pike
 Pottstown, Pennsylvania 19464
 Telephone: (610) 495-6255 FAX: (610) 495-7353

Project 5201G1
Figure II
SITE GEOLOGY
 Atlas of Geologic Quadrangle Maps of PA
 Unionville Quadrangle



KEY

GgB - Glenelg silt loam, 3 to 8 percent slopes

GEOTECHNICAL & ENVIRONMENTAL ENGINE
DAVID BLACKMORE & ASSOC., INC.
 3335 West Ridge Pike
 Pottstown, Pennsylvania 19464
 Telephone: (610) 495-6255 FAX: (610) 495-7353

Project 5201G1
Figure III
SITE SOILS
 Web Soil Survey of Chester County, PA

**TABLE II
APPROXIMATE DENSE WEATHERED ROCK ELEVATIONS**

Boring Number	Surface Elevation	Depth to Dense Weathered Rock¹	Dense Weathered Rock Elevation
B1	404.6 feet	10.5 feet	394.1 feet
B2	405.8 feet	12.0 feet	393.8 feet
B3	405.7 feet	12.5 feet	393.2 feet
B4	403.7 feet	15.0 feet	388.7 feet
B5	405.0 feet	10.0 feet	395.0 feet
B6	403.2 feet	10.5 feet	392.7 feet
B7	402.0 feet	13.0 feet	389.0 feet

NOTES:

Surface elevations at each boring location were determined in the field using an grate elevation of 402.83 feet for the Type 'M' inlet located immediately adjacent to the southeastern corner of the existing building provided on the Existing Features/Demo Plan prepared by E.B. Walsh Associates, Sheet 2 of 6, dated 8-29-2019.

¹ As determined by drilling difficulty and Standard Penetration Resistance data.

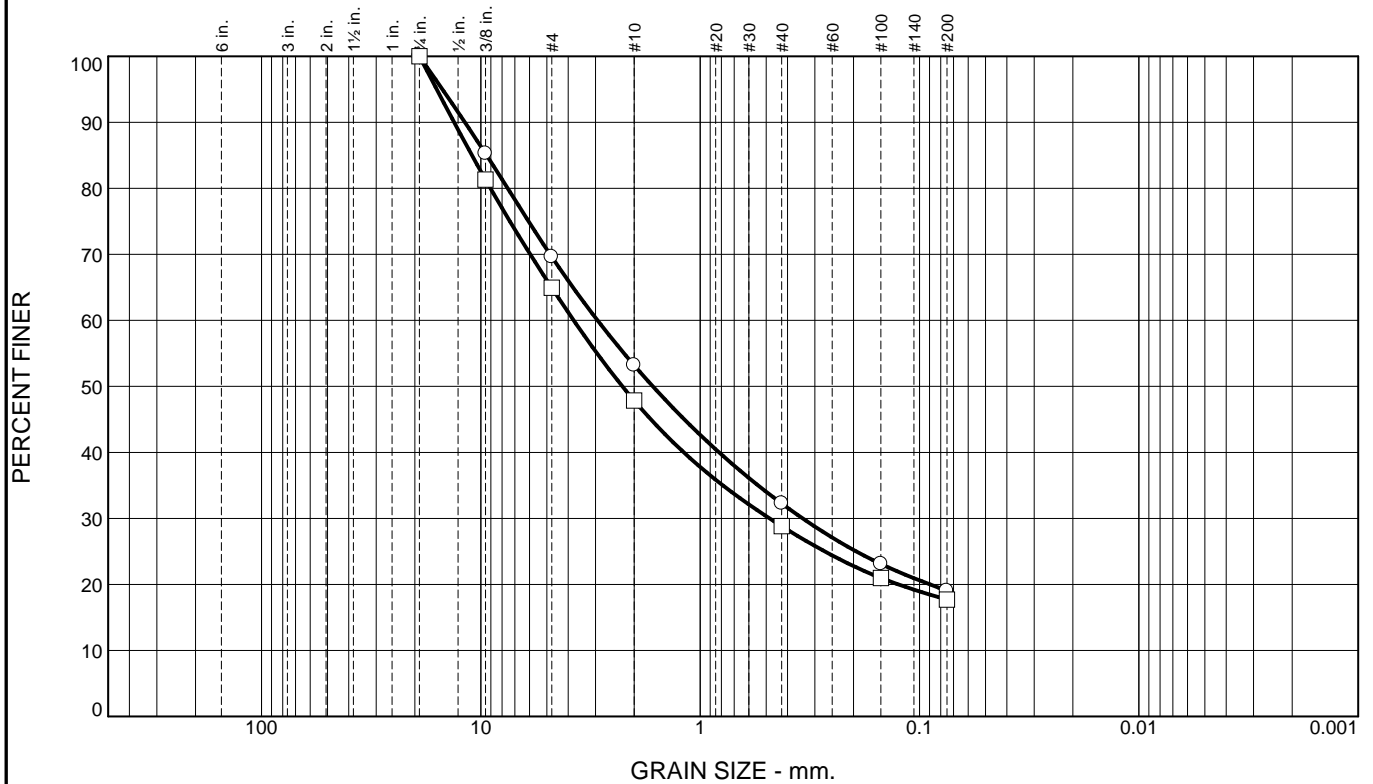
**TABLE III
COMPACTION CRITERIA**

LOCATION	PERCENT COMPACTION (ASTM-D698)
Foundations	98%
Floor Slabs	98%
Pavements	95%
Berms (non-structural)	93%

APPENDIX

SOIL PARTICLE SIZE ANALYSIS RESULTS

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	46.8		53.2		SM	NV	NP	NP
□	0.0	52.1		47.9		SM	NV	NP	

SIEVE inches size	PERCENT FINER	
	○	□
.75	100.0	100.0
.375	85.3	81.3
GRAIN SIZE		
D ₆₀	2.9388	3.7746
D ₃₀	0.3411	0.4826
D ₁₀		
COEFFICIENTS		
C _c		
C _u		

SIEVE number size	PERCENT FINER	
	○	□
#4	69.6	64.9
#10	53.2	47.9
#40	32.3	28.8
#100	23.1	21.0
#200	19.0	17.7

Material Description
 silty sand with gravel (Stratum I)
 silty sand with gravel (Stratum II)

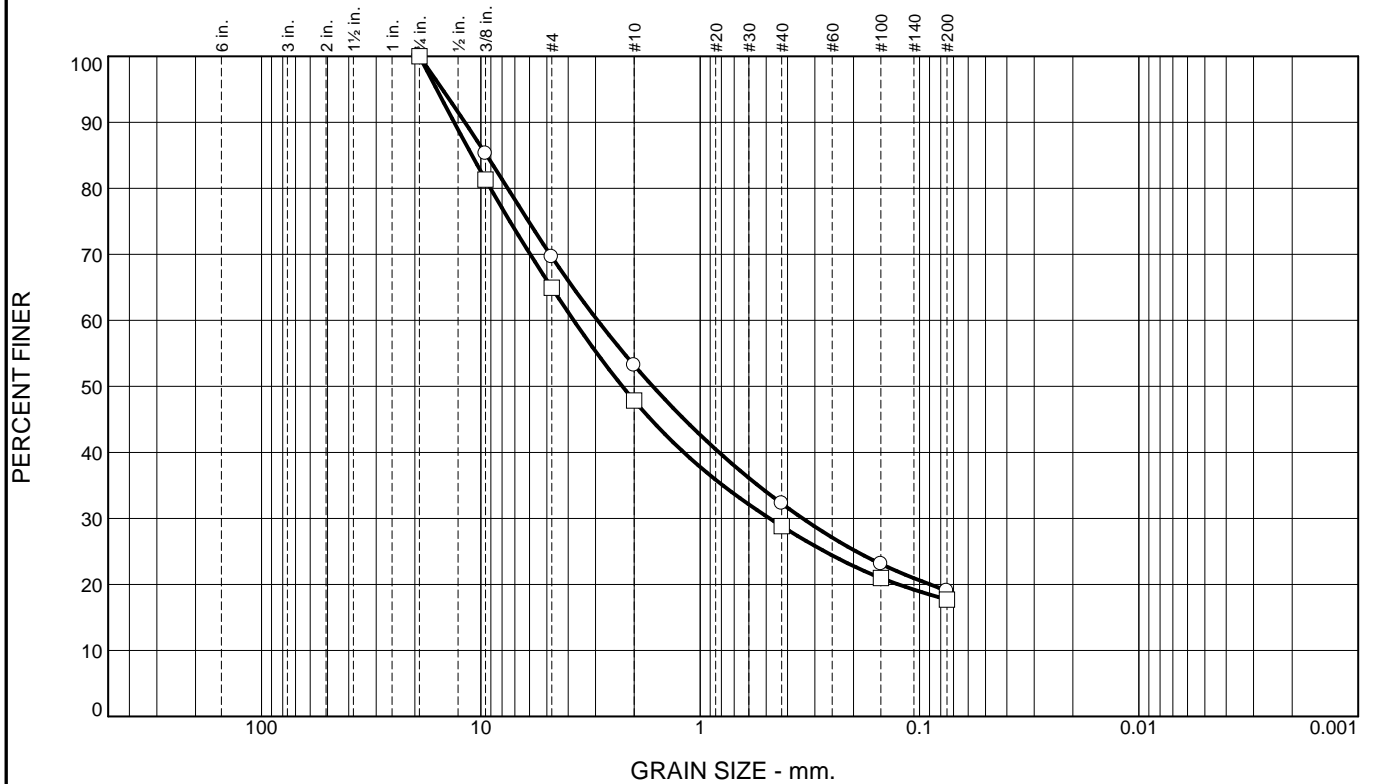
REMARKS:
 NMC: B1-S1: 13.4%
 B1-S2: 11.3%
 NMC: B1-S3: 7.4%
 B1-S4: 11.9%

○ Source of Sample: B1 Depth: 2-6 FT Sample Number: S1-S2
 □ Source of Sample: B1 Depth: 9-16 FT Sample Number: S3-S4



Client: KIMMEL BOGRETTE Architecture + Site
 Project: Additions and Renovations to West Bradford Twp Bld
 Project No.: 5201G1

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	46.8		53.2		SM	NV	NP	
□	0.0	52.1		47.9		SM	NV	NP	

SIEVE inches size	PERCENT FINER	
	○	□
.75	100.0	100.0
.375	85.3	81.3
GRAIN SIZE		
D60	2.9388	3.7746
D30	0.3411	0.4826
D10		
COEFFICIENTS		
C _c		
C _u		

SIEVE number size	PERCENT FINER	
	○	□
#4	69.6	64.9
#10	53.2	47.9
#40	32.3	28.8
#100	23.1	21.0
#200	19.0	17.7

Material Description
 silty sand with gravel (Stratum I)
 silty sand with gravel (Stratum II)

REMARKS:
 NMC: B1-S1: 13.4%
 B1-S2: 11.3%
 NMC: B1-S3: 7.4%
 B1-S4: 11.9%

○ Source of Sample: B1 Depth: 2-6 FT Sample Number: S1-S2
 □ Source of Sample: B1 Depth: 9-16 FT Sample Number: S3-S4



Client: KIMMEL BOGRETTE Architecture + Site
 Project: Additions and Renovations to West Bradford Twp Bld
 Project No.: 5201G1

Plate

TEST BORING LOGS



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B1

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 19'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 19' to 20'5"

Project Number : 5201G1
 Date Drilled : 3/13/2020
 Inspected by : RM
 Boring Depth: 20.42'
 Ground Surface Elevation (ft msl) : 404.57'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (5 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot) 1 100
0.0			Topsoil (10")	0.83	403.74					
1.0			Stratum I							
2.0			Orange brown and brown fine sand and silt with many phyllite fragments and occasional quartz fragments	3.25	401.32	S-1*		5-5-6-7	11	
3.0			Orange brown and brown fine sand and silt with phyllite and quartz fragments			S-2*		7-8-7-8	15	
4.0										
5.0										
6.0										
7.0				7.50	397.07					
8.0			Stratum II							
9.0			Multi-colored weathered phyllite			S-3		12-26-50/4"	100	
10.0										
11.0										
12.0										
13.0										
14.0										
15.0						S-4		17-17-21-23	38	
16.0										
17.0										
18.0										
19.0										
20.0				20.42	384.15	S-5		15-18-50/5"	100	
21.0			Spoon Refusal on Dense Weathered Phyllite							
22.0										
23.0										
24.0										

Notes:

*Sample was moist
 Hard Augering from 10.5' to

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B2

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 18'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 18' to 18'5"

Project Number : 5201G1
 Date Drilled : 3/13/2020
 Inspected by : RM
 Boring Depth: 18.42'
 Ground Surface Elevation (ft msl) : 405.84'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (6 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot)
0.0			Topsoil (6")	0.50	405.34					
1.0			Stratum I Orange brown fine sand and silt with many phyllite fragments and some quartz fragments							
3.0						S-1		1-2-5-5	7	
5.0						S-2		8-8-8-6	16	
6.0				6.25	399.59					
7.0			Stratum II Multi-colored weathered phyllite							
7.0						S-3		5-5-10-10	15	
9.0						S-4		10-11-11-10	22	
13.0						S-5		50/4"	100	
18.0				18.42	387.42	S-6		50/5"	100	
19.0			Spoon Refusal on Dense Weathered Phyllite							
20.0										

Notes:
 Hard Augering from 12'

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B3

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 18'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 18' to 18'2"

Project Number : 5201G1
 Date Drilled : 3/13/2020
 Inspected by : RM
 Boring Depth: 18.17'
 Ground Surface Elevation (ft msl) : 405.68'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (4 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot)
0.0			Topsoil (6")	0.50	405.18					
1.0			Stratum I Orange brown fine sand and silt with phyllite fragments and some quartz fragments							
2.0										
3.0										
4.0										
5.0			Stratum II Multi-colored weathered phyllite	5.00	400.68	S-1*		2-2-3-5	5	
6.0										
7.0							S-2*		4-6-6-5	12
8.0							S-3*		4-5-7-7	12
9.0										
10.0						S-4		8-10-19-22	29	
11.0										
12.0										
13.0										
14.0						S-5		50/3"	100	
15.0										
16.0										
17.0										
18.0				18.17	387.51	S-6		50/2"	100	
19.0			Spoon Refusal on Dense Weathered Phyllite							
20.0										

Notes:
 *Sample was moist
 Hard Augering from 12.5'

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B4

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 19'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 19' to 19'1"

Project Number : 5201G1
 Date Drilled : 3/13/2020
 Inspected by : RM
 Boring Depth: 19.08'
 Ground Surface Elevation (ft msl) : 403.72'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (1 hr)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot) 1 100
0.0			Topsoil (10")	0.83	402.89					
1.0			Stratum I Orange brown fine sand and silt with phyllite fragments and some quartz fragments							
3.0						S-1*		3-5-6-7	11	
5.0				5.17	398.55	S-2*		7-7-7-8	14	
6.0			Stratum II Multi-colored weathered phyllite							
10.0						S-3		15-21-31-38	52	
14.0						S-4		42-50/4"	100	
15.0			Notes: *Sample was moist Hard Augering from 15' Very Hard Augering from 18.5'							
19.0				19.08	384.64	S-5		50/1" N.R.	100	
20.0			Spoon Refusal on Dense Weathered Phyllite							
21.0										

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B5

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 19'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 19' to 19'4"

Project Number : 5201G1
 Date Drilled : 3/13/2020
 Inspected by : RM
 Boring Depth: 19.33'
 Ground Surface Elevation (ft msl) : 405.03'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (3 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot)
0.0			Topsoil (8')	0.67	404.36					
1.0			Stratum I Orange brown fine sand and silt with phyllite fragments and some quartz fragments							
3.0						S-1*		3-5-5-9	10	
5.0				5.25	399.78	S-2*		10-11-10-10	21	
6.0			Stratum II Multi-colored weathered phyllite							
9.0						S-3		41-50/5"	100	
14.0						S-4		50/5"	100	
16.0			Notes: *Sample was moist Hard Augering from 10'							
19.0				19.33	385.70	S-5		50/4"	100	
20.0			Spoon Refusal on Dense Weathered Phyllite							
21.0										

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B6

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 19'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 19' to 19'9"

Project Number : 5201G1
 Date Drilled : 5/1/2020
 Inspected by : RM
 Boring Depth: 19.75'
 Ground Surface Elevation (ft msl) : 403.2'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (3 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA					
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content 510 20 30 40 50	SPT DATA	SPT Value	SPT GRAPH (Blows Per Foot)
0.0			Mulch (3")	0.83	402.37					
0.83			Topsoil (7")							
2.0			Stratum IF FILL consisting of orange brown and brown micaceous fine sand and silt with some phyllite fragments	2.67	400.53					
3.0						S-1*		4-5-5-5	10	
4.0			Stratum I Orange brown fine sand and silt with occasional phyllite fragments	4.75	398.45					
5.0						S-2**		4-5-6-6	11	
7.0			Orange brown and brown micaceous fine sand and silt with many phyllite fragments	7.50	395.70					
8.0			Stratum II Multi-colored weathered phyllite							
10.0						S-3		29-22-50/5"	100	
14.0						S-4		50/5"	100	
19.0						S-5		40-50/3"	100	
19.75				19.75	383.45					
20.0			Spoon Refusal on Dense Weathered Phyllite							

Notes:

*Sample was very moist

**Sample was moist

Hard Augering from 10.5'

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S=Split Spoon sample(2" O.D.), C=Rock Coring Run.



DAVID BLACKMORE & ASSOCIATES, INC.
Geotechnical & Environmental Engineers

Phone: 610-495-6255 Fax: 610-495-7353
 www.dbaengineering.com

Boring Number : B7

Sheet 1 of 1

Project : West Bradford Township Building Additions
 Location: 1385 Campus Drive
 Twp/City/State: West Bradford Township/Chester County/PA
 Drilling Contractor : Corcoran Drilling Co, Inc.
 X Coordinate (ft) : 0 Y Coordinate (ft) : 0
 Drilling Method #1 : 6" Diameter Solid Augers from 0' to 19'
 Drilling Method #2: 2" OD Split-Spoon Sampler from 19' to 19'1"

Project Number : 5201G1
 Date Drilled : 5/1/2020
 Inspected by : RM
 Boring Depth: 19.08'
 Ground Surface Elevation (ft msl) : 402.0'
 Water Level - Immediate (ft bgs) : DRY (5 min)
 Water Level -Static (ft bgs): DRY (2 hrs)

DEPTH BELOW	WATER LEVEL	LITHOLOGY			SAMPLING DATA				
		LITHOLOGIC SYMBOL	GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	DEPTH (FT)	ELEVATION	NUMBER	Water Content	SPT DATA	SPT Value
0.0			Topsoil (10")	0.83	401.17				
1.0			Stratum I Orange brown fine sand and silt, some clay with trace of rock fragments	3.00	399.00	S-1*		1-1-2-5	3
4.0			Orange brown and brown micaceous fine sand and silt with phyllite fragments, occasional quartz fragments	4.25	397.75	S-2**		6-7-7-6	14
6.0			Stratum II Multi-colored weathered phyllite						
10.0						S-3		7-13-28-36	41
14.0						S-4		50/2"	100
19.0				19.08	382.92	S-5		50/1"	100
20.0			Spoon Refusal on Dense Weathered Phyllite						

Notes:

*Sample was very moist

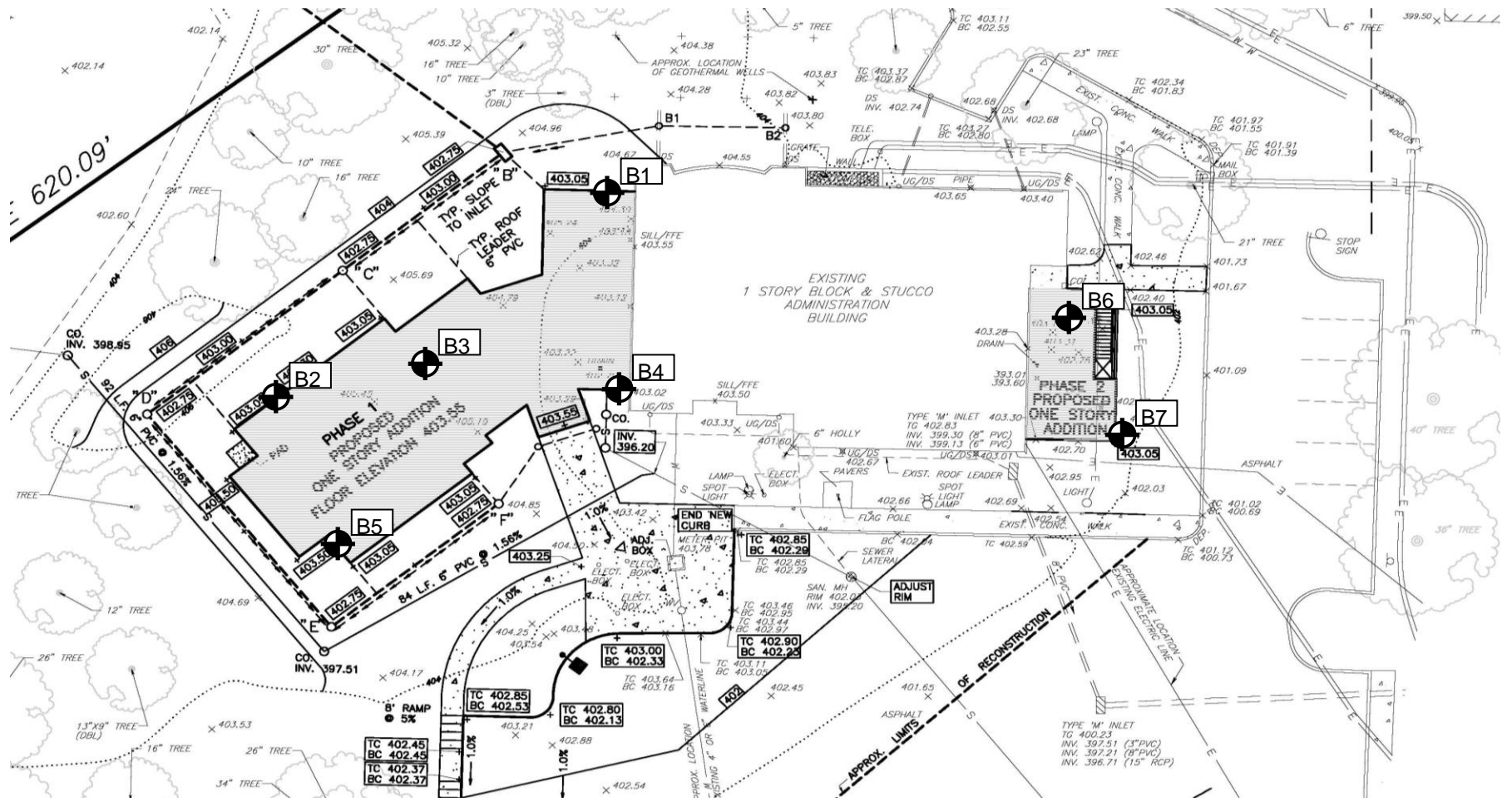
**Sample was moist

Hard augering from 13'

Very hard augering from 15.5'

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water level. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.

TEST BORING LOCATION PLAN



GEOTECHNICAL & ENVIRONMENTAL ENGINEERS
DAVID BLACKMORE & ASSOC., INC.
 3335 West Ridge Pike
 Pottstown, Pennsylvania 19464
 Telephone: (610) 495-6255 FAX: (610) 495-7353

Project 5201G1
TEST BORING LOCATION PLAN
West Bradford Township Building
 1385 Campus Drive
 West Bradford Township, Chester County, PA

SECTION 02-4116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of buildings and site improvements.
2. Removing below-grade construction.
3. Disconnecting, capping or sealing, and abandoning in-place removing site utilities.
4. Salvaging items for reuse by Owner.

B. Related Requirements:

1. Section 01-1000 "Summary" for use of the premises and phasing requirements.
2. Section 01-3200 "Construction Progress Documentation" for preconstruction photographs taken before building demolition.
3. Section 31-1000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structures.
 - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review and finalize protection requirements.
 - 5. Review procedures for noise control and dust control.
 - 6. Review procedures for protection of adjacent buildings.
 - 7. Review items to be salvaged and returned to Owner.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 CLOSEOUT SUBMITTALS

1.8 QUALITY ASSURANCE

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

1.9 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before building demolition, Owner will remove the following items:
 - a. All equipment, furnishings and other Owner items.
- D. Hazardous Materials: No hazardous materials are expected in the demolition areas.
 - 1. If materials suspected of containing hazardous materials are encountered that are not identified in the Hazardous Materials survey, do not disturb; immediately notify Architect and Owner. Hazardous materials will be sampled, tested and removed (if necessary) by Owner under a separate contract.
- E. On-site storage or sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2.2 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Section 31-2000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, Mechanical Contractor to remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to be Disconnected: Each Prime shall locate, identify, disconnect, and seal or cap off their utilities serving buildings and structures to be demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 3. Cut off pipe or conduit a minimum of **24 inches** below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction. Leave work ready for reconnection to new building.
 - 4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01-5000 "Temporary Facilities and Controls."
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.

3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least 4 hours after flame-cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

3.6 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

- C. Salvage: Items to be removed and salvaged are indicated below. Remove and store on property where directed by the Owner.
 - 1. None. Existing flagpole to become the property of the GC and is to be removed from the site.
- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- E. Existing Utilities: Demolish existing utilities and below-grade utility structures that are within 5 feet of the future building construction.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction. and recycle or dispose of them according to Section 01-7419 "Construction Waste Management and Disposal."
 - 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.
- B. Do not burn demolished materials.

3.8 CLEANING

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

END OF SECTION 02-4116

SECTION 03-3000 - 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. Section Includes:

- 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

- 1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
- 2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
- 3. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
- 4. Section 033543 "Polished Concrete Finishing" for concrete floors scheduled to receive a polished concrete finish.
- 5. Section 035300 "Concrete Topping" for emery- and iron-aggregate concrete floor toppings.
- 6. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
- 7. Section 321313 "Concrete Paving" for concrete pavement and walks.
- 8. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site .
 - 1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.

- b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Special concrete finish Subcontractor.
2. Review the following:
- a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Anchor rod and anchorage device installation tolerances.
 - e. Cold and hot weather concreting procedures.
 - f. Concrete finishes and finishing.
 - g. Curing procedures.
 - h. Forms and form-removal limitations.
 - i. Shoring and reshoring procedures.
 - j. Methods for achieving specified floor and slab flatness and levelness.
 - k. Floor and slab flatness and levelness measurements.
 - l. Concrete repair procedures.
 - m. Concrete protection.
 - n. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
 - o. Protection of field cured field test cylinders.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement
7. Aggregates.
8. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
9. Floor and slab treatments.
10. Curing materials.
 - a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
11. Joint fillers.
12. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.

8. Nominal maximum aggregate size.
9. Steel-fiber reinforcement content.
10. Synthetic micro-fiber content.
11. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
12. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
13. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
14. Intended placement method.
15. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:
 - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete, incorporating permeability-reducing admixtures.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and **ACI 301**.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with **ACI 301** and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below **40 deg F** for three successive days, maintain delivered concrete mixture temperature within the temperature range required by **ACI 301**.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than **35 deg F**, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with **ACI 301** and **ACI 305.1**, and as follows:
 - 1. Maintain concrete temperature at time of discharge to not exceed **95 deg F**.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with **ACI 301** unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
 - 1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 - 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 - 3. Obtain aggregate from single source.
 - 4. Obtain each type of admixture from single source from single manufacturer.

- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I/II.
 2. Fly Ash: ASTM C618, Class C or F.
 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
 4. Blended Hydraulic Cement: ASTM C595/C595M, cement.
 5. Silica Fume: ASTM C1240 amorphous silica.
- C. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
 2. Maximum Coarse-Aggregate Size: Not larger than one-fifth the narrowest dimensions between the sides of forms of the member for which the concrete is to be used. In general, the maximum size shall be 1-1/2 inches for foundations, 1 inch for piers, and 3/4 inch for slabs. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Retarding Admixture: ASTM C494/C494M, Type B.
- E. Water and Water Used to Make Ice: ASTM C94/C94M and potable.

2.3 FLOOR AND SLAB TREATMENTS

2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- C. Water: Potable or complying with ASTM C1602/C1602M.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, in accordance with ASTM D2240.

2.6 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, in accordance with **ACI 301**.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing 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 concrete with a w/cm below 0.50.
 - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
 - 5. Use permeability-reducing admixture in concrete mixtures where indicated.
- D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXTURES

- A. Class A : Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Minimum Compressive Strength: **4000 psi** at 28 days.
 - 2. Maximum w/cm: 0.46.
 - 3. Slump Limit: **4 inches** , plus or minus **1 inch** .
 - 4. Air Content:
 - a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing **1-inch** nominal maximum aggregate size.
 - b. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing **1-inch** nominal maximum aggregate size.

- B. Class B : Normal-weight concrete used for foundation walls and piers.
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Maximum w/cm: 0.46.
 3. Slump Limit: 4 inches , plus or minus 1 inch .
 4. Air Content:
 - a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size.
 - b. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size.
- C. Class C : Normal-weight concrete used for slabs-on-ground.
1. Minimum Compressive Strength: As Indicated on Drawings at 28 days.
 2. Maximum w/cm: 0.46.
 3. Slump Limit: 4 inches , plus or minus 1 inch
 4. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors. For other slabs, air content shall be 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
 5. Steel-Fiber Reinforcement: Add to concrete mixture, in accordance with manufacturer's written instructions, at a rate of 50 lb/cu. yd.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.

4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF 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.
 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
 3. 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.

3.4 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least **1-1/2 inches** into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of **1/8 inch**. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch-** wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of **ACI 301**, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with **ACI 301**.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least **6 inches** into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. 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.
- F. 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. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.

7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.6 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. **ACI 301** Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than **1-1/2 inches** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1 inch**.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: **ACI 117** Class D.
 - e. Apply to concrete surfaces not exposed to public view.
2. **ACI 301** Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1/4 inch**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117** Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view
3. **ACI 301** Surface Finish SF-3.0:
 - a. Patch voids larger than **3/4 inch** wide or **1/2 inch** deep.
 - b. Remove projections larger than **1/8 inch**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117** Class A.
 - e. Locations: Apply to concrete surfaces exposed to public view.

3.7 FINISHING FLOORS AND SLABS

- #### A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces 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.
7. Finish surfaces to the following tolerances, in accordance with **ASTM E1155**, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Specified overall values of flatness, FF 25; and of levelness, FL 20; with minimum local values of flatness, FF 17; and of levelness, FL 15.

3.8 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. 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:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases **6 inches** high unless otherwise indicated on Drawings, and extend base not less than **6 inches** in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: **4000 psi** at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on **18-inch** centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.

1. Cast-in inserts and accessories, as shown on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.9 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with **ACI 301** and ACI 306.1 for cold weather protection during curing.
2. Comply with **ACI 301** and **ACI 305.1** for hot-weather protection during curing.
3. Maintain moisture loss no more than **0.2 lb/sq. ft. x h** before and during finishing operations.

B. Curing Formed Surfaces: Comply with **ACI 308.1** as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with **ACI 308.1** as follows:
1. Begin curing immediately after finishing concrete.
 2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than **12-inches**.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than **12 inches**.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches**, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.

- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Polished Finish: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than **12 inches**.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- d. Floors to Receive Chemical Stain:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
 - 2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
 - 3) Butt sides of curing paper tight; do not overlap sides of curing paper.
 - 4) Leave curing paper in place for duration of curing period, but not less than 28 days.
- e. Floors to Receive Urethane Flooring:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped **6 inches** and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- f. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
- g. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.10 TOLERANCES

- A. Conform to **ACI 117**.

3.11 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than **seven** days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 4. Rinse with water; remove excess material until surface is dry.
 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least [**one**] month.
 2. 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 joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least **2 inches** deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a **No. 16** 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** in any dimension to solid concrete.
 - a. Limit cut depth to **3/4 inch**.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.

- e. 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 matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of **0.01 inch** wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of **1/4 inch** to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes **1 inch** or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a **3/4-inch** clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes **1 inch** or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. 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.

3.14 PROTECTION

- A. Protect concrete surfaces as follows:
 - 1. Protect from petroleum stains.
 - 2. Diaper hydraulic equipment used over concrete surfaces.
 - 3. Prohibit vehicles from interior concrete slabs.
 - 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 - 5. Prohibit placement of steel items on concrete surfaces.
 - 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 - 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
 - 8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03-3000

SECTION 04-7321 – FULL BED MASONRY UNITS

- 1 General
- 1.1 SECTION INCLUDES
 - .1 Calcium silicate masonry units.
- 1.2 SAMPLES
 - .1 Submit samples as specified in Section 01-3300.
 - .2 Samples: One full size sample, illustrating color and texture.
- 1.3 TEST REPORTS
 - .1 Submit test reports as specified in Section 01-3300
 - .2 Test Reports: Test results prepared by an independent testing agency, indicating tested material characteristics as part of a source quality control program, current within the past five (5) years.
- 1.4 QUALITY ASSURANCE
 - .1 Manufacturer Qualifications: Manufacturer having sufficient plant facilities to produce the shapes, quantities and size of Products required in accordance with the project schedule.
 - .2 Installer: Company or person specializing in commercial masonry work with 5 years documented experience.
 - .3 Mock-up: Supply sufficient quantity of full size calcium silicate masonry units for use in constructing mock-up panel. Erect panel where directed by Architect. Mock up panel may become part of the work if approved by the Architect.
- 1.5 DELIVERY, STORAGE AND HANDLING
 - .1 Refer to Section 01-0000.
 - .2 Deliver calcium silicate masonry units in protective film. Prevent damage to units.
 - .3 Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.
 - .4 Store units in a manner designed to prevent damage and staining of units.
 - .5 Stack units on timbers or platforms at least 3 inches above grade.
 - .6 Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.
 - .7 Cover stored units with protective enclosure if exposed to weather.
 - .8 Do not use salt or calcium-chloride to remove ice from masonry surfaces.

2 Products

2.1 MANUFACTURERS

- .1 Manufacturers of calcium silicate masonry units having Products considered acceptable for use:
 - .1 Arriscraft, which is the Basis of Design product.
 - .2 Substitutions: are acceptable as per Section 01-2500

2.2 MATERIALS

- .1 Calcium Silicate Masonry Units (Cambridge): to ASTM C73, Grade SW; solid units that have been pressure formed and autoclaved; 3-5/8" bed depth; special shapes as indicated; and as follows:
 - .1 Modular Size: 3-5/8" high, 31-5/8" long as indicated on Drawings.
 - .2 Texture: sandblasted finish on exposed faces.
 - .3 Color: as indicated on elevation sheets.
 - .4 Product and Manufacturer's Name: Evolution Masonry Units by Arriscraft.
- .2 Mortar: 1:1:6 Portland cement-hydrated lime-sand mix.
- .3 Grout: maximum 6,500 psi at 28 days.
- .4 Wall Ties and Anchorages: as required by manufacturer.
- .5 Joint Sealants and Backer Rods: non-staining type.
- .6 Provide PVC weeps at 24" O.C. in color to match mortar.

2.3 FABRICATION TOLERANCES

- .1 Fabricate calcium silicate masonry units to the following tolerances:
 - .1 Unit Length: plus or minus 1/16".
 - .2 Unit Height: plus or minus 1/16".
 - .3 Deviation From Square: plus or minus 1/16", with measurement taken using the longest edge as the base.
 - .4 Bed Depth: plus or minus 1/8".
 - .5 Custom Unit Dimensions: plus or minus 1/8".

3 Execution

3.1 EXAMINATION

- .1 Verify site conditions are ready to receive work.
- .2 Inspect materials for fit and finish prior to installation. Do not set unacceptable units.
- .3 Beginning of installation means acceptance of existing conditions.

3.2 CUTTING MASONRY UNITS

- .1 Cut masonry units with wet-saw.

- .2 Pre-soak units using clean water prior to cutting.
- .3 Clean cut units using a stiff fibre brush and clean water. Allow units to surface dry prior to placement.
- .4 Finish cut edges to match face when exposed in wall.

3.3 WETTING MASONRY UNITS

- .1 Where the ambient air temperature exceeds 100°F or exceeds 90°F with a wind velocity greater than 8 mph, pre-wet masonry units.
- .2 Lay wetted units when surface dry.

3.4 COURSING

- .1 Place masonry to lines and levels indicated.
- .2 Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- .3 Lay masonry units in half-running bond.
- .4 Course one masonry unit and one mortar joint to equal 4 inches.
- .4 Maintain mortar joint thickness of 3/8 inch.
- .5 Tool mortar joints by compacting the surface when thumbprint hard, to a raked finish.

3.5 PLACING AND BONDING

- .1 Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- .2 Fully bond intersections, and external corners.
- .3 Do not adjust masonry units after laying. Where resetting of masonry is required, remove, clean units and reset in new mortar.
- .4 Install lintels as scheduled.
- .5 Install wall ties and anchorages as recommended by manufacturer.
- .6 Install flashings, vents, and masonry accessories.
- .7 Construct movement joints as indicated on drawings or as per standard practice.

3.6 SITE TOLERANCES

- .1 Erect masonry within the tolerances described in TMS 602, PART 3.3F.

3.7 FIELD QUALITY CONTROL

- .1 Architect Inspection: Architect will inspect installed masonry and reject masonry that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.

- .1 Masonry will be inspected to be free of cracks or other blemishes on the finished face or front edges of the masonry units exceeding 3/8 inch or that can be seen from a distance of 20 feet.
- .2 Units shall exhibit a texture approximately equal to the approved sample when viewed under diffused daylight illumination at a 20 foot distance.
- .3 Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under diffused daylight illumination from a 20 foot distance.
- .4 Efflorescence will not be cause for rejection.

- .2 Make Good rejected masonry as directed by Architect.

3.8 ADJUSTING AND CLEANING

- .1 Repair chips on smooth finished units with patch kits furnished by manufacturer.
- .2 Clean all masonry units as recommended by the manufacturer.
- .3 Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.9 PROTECTION

- .1 Protect units from damage resulting from subsequent construction operations.
- .2 Use protection materials and methods which will not stain or damage units.
- .3 Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

END OF SECTION

SECTION 04-7325 – THIN CLAD MASONRY UNITS

PART 1 – GENERAL

1.01 SUMMARY

- A. Scope of work - Provide manufactured adhered veneer (units size thickness ranging from a minimum 1/4" [6mm] up to a maximum 2-5/8" [65mm] according to IBC – Chapter 14 Exterior Walls or applicable local building codes for thin adhered masonry veneer), veneer installation materials and accessories as indicated on drawings, as specified herein, and as needed for complete and proper installation.
- B. Related Documents - provisions within General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings apply to this Section.

1.02 SECTION INCLUDES

- A. Thin adhered calcium silicate Building Stone masonry units (also referenced as thin CSMU) ARRIS▪stack Units
- B. Installation Products; adhesives, mortars, grouts and sealants
- C. Air and Water Barriers

1.03 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- A. Environmental Performance Criteria: The following criteria are required for products included in this section.

Refer to Division 1 for additional requirements:

- 1. Adhesive products must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 and Bay Area Resources Board Reg. 8, Rule 51.

1.04 REFERENCE STANDARDS

- A. American Iron and Steel Institute (AISI) Specification for the Design of Cold-Formed Steel Structural Members
- B. American National Standards Institute (ANSI) A118.1 - A118.12 American National Standard Specifications For The Installation Of Ceramic Tile
- C. ICC-ES AC212 - WATER-RESISTIVE COATINGS USED AS WATER-RESISTIVE BARRIERS OVER EXTERIOR SHEATHING
- D. American Plywood Association (APA) Y510T Plywood Design Specifications
- E. American Society For Testing And Materials (ASTM) C36 Standard Specification for Gypsum Wallboard
- F. American Society For Testing And Materials (ASTM) C482 Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement
- G. American Society For Testing And Materials (ASTM) C847 Standard Specification for Metal Lath
- H. American Society For Testing And Materials (ASTM) C920 Standard Specification for Elastomeric Joint Sealants
- I. American Society For Testing And Materials (ASTM) C955 Standard Specification for Load Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases
- J. American Society For Testing And Materials (ASTM) E96 Standard Test Methods for Water Vapor Transmission of Materials
- K. Canadian Sheet Steel Building Institute (CSSBI) Lightweight Steel Framing Binder {Publication 52M}
- L. Metal Lath/Steel Framing Association (ML/SFA) 540 Lightweight Steel Framing Systems Manual
- M. Steel Stud Manufacturers Association (SSMA) Product Technical Information and ICBO Evaluation Service, Inc. Report ER-4943P

- N. Terrazzo, Tile And Marble Association Of Canada (TTMAC) Specification Guide 09300 Tile Installation Manual
- O. Tile Council Of North America (TCNA) Handbook For Ceramic Tile Installation
- P. ACI 530/ASCE 5/TMS 402-[____], Building Code Requirements for Masonry Structures.
- Q. ACI 530.1/ASCE 6/TMS 602-[____], Specifications for Masonry Structures.
- R. ASTM C73-[____]: Standard Specification for Calcium Silicate Face Brick.

1.05 SYSTEM DESCRIPTION

- A. Thin Adhered CSMU Building Stone installed over steel framing, exterior rated sheathing, liquid air and water barrier , drainage mat, cement backer board, latex portland cement mortar and portland cement pointing mortar

1.06 SUBMITTALS

- A. Submit profile drawings and manufacturers' product data under provisions of Section 01 33 00.
- B. Submit ONE (1) samples of each type/style/finish/size/color of adhered masonry veneer and trim unit under provisions of Section 01 33 00.
- C. Submit manufacturers' installation instructions under provisions of Section 01 33 00
- D. Submit proof of warranty.
- E. Submit sample of installation system demonstrating compatibility/functional relationships between air barriers, waterproofing membranes, adhesives, mortars pointing mortars and other components under provision of Section 01 33 00.
- F. For alternate materials, at least thirty (30) days before bid date submit independent laboratory test results confirming compliance with specifications listed in Part 2 - Products.

1.07 QUALITY ASSURANCE

- A. Adhered Masonry Veneer Manufacturer (single source responsibility): Company specializing in adhered masonry veneer, trim units with Five (5) years minimum experience. Obtain adhered masonry veneer from a single source with resources to provide products of consistent quality in appearance and physical properties.
- B. Installation System Manufacturer (single source responsibility): Company specializing in air barriers, waterproofing membranes, adhesives, mortars pointing mortars and other installation materials with ten (10) years minimum experience and ISO 9001 certification. Obtain installation materials from single source manufacturer to insure consistent quality and full compatibility.
- C. Submit positive laboratory testing to confirm applicability of air barrier, waterproofing membranes, adhesives, mortars pointing mortars, and other installation materials for specified job conditions.
- D. Installer qualifications: company specializing in installation of adhered masonry veneer and trim units with five (5) years documented experience with installations of similar scope, materials and design.

1.08 MOCK-UPS

- A. Provide mock-up of each type/style/finish/size/color of adhered masonry veneer and trim unit along with respective installation air barrier, waterproofing membranes, adhesives, mortars pointing mortars and other installation materials. With approval of the Architect mock up can become part of the work.

1.09 PRE-INSTALLATION CONFERENCE

- A. Pre-installation conference: At least three weeks prior to commencing the work attend a meeting at the jobsite to discuss conformance with requirements of specification and job site conditions. Representatives of owner, architect, general contractor, adhered masonry veneer subcontractor, adhered masonry veneer manufacturer, Installation System Manufacturer and any other parties who are involved in the scope of this installation must attend the meeting.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 00 00.
- B. Deliver calcium silicate building stone masonry units in protective film. Prevent damage to units.
- C. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.
- D. Store units in a manner designed to prevent damage and staining of units.
- E. Stack units on timbers or platforms at least 3 inches above grade.
- F. Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.
- G. Cover stored units with protective enclosure if exposed to weather.
- H. Do not use salt or calcium-chloride to remove ice from masonry surfaces.
- I. Store adhered masonry veneer and installation system materials in a dry location; handle in a manner to prevent chipping, breakage, and contamination.
- J. Protect latex additives, liquid air barriers, waterproofing membranes, epoxy adhesives and sealants from freezing or overheating in accordance with manufacturer's instructions; store at room temperature when possible.
- K. Store portland cement mortars and pointing mortars in a dry location.

1.11 PROJECT/SITE CONDITIONS

- A. Provide ventilation and protection of environment as recommended by manufacturer.
- B. Prevent carbon dioxide damage to adhered masonry veneer, trim, as well as adhesives, liquid air and water barrier ,mortars, pointing mortars and other installation materials, by venting temporary heaters to the exterior.
- C. Maintain ambient temperatures not less than 37°F (3°C) or more than 100°F (38°C) during installation and for a minimum of seven (7) days after completion. Setting of portland cement is retarded by low temperatures.
 - 1. Protect work for extended period of time and from damage by other trades.
 - 2. Epoxy mortars and epoxy pointing mortars require surface temperatures between 60°F (16°C) and 90°F (32°C) at time of installation.
 - 3. Liquid air barrier and waterproofing Membranes require surface temperatures between 50°F (10°C) and 90°F (32°C). It is the General Contractor's responsibility to maintain temperature control.

1.12 SEQUENCING AND SCHEDULING

- A. Coordinate installation of adhered masonry veneer work with related work.
- B. Proceed with adhered masonry veneer work only after curbs, vents, drains, piping, and other projections through substrate have been installed and when substrate construction and framing of openings have been completed.

1.13 WARRANTY

- A. Thin Adhered CSMU Building Stone installed over steel or wood framing
 - 1. The Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of 15 years. The manufacturer of adhesives, liquid air and water barrier, mortars, pointing mortars and other installation materials shall provide a written twenty five (15) year warranty, which covers materials and labor - reference LATICRETE Warranty Data Sheet 230.15SPD for complete details and requirements.

1.19 EXTRA MATERIAL STOCK

- A. Extra stock is to be from same production run or batch as original adhered masonry veneer and installation materials.

- B. Upon completion of the work of this Section, deliver to the Owner 2% minimum additional adhered masonry veneer and trim shapes or a minimum of 2 additional pieces of each type, color, pattern and size used in the Work, as well as extra stock of adhesives, mortars, pointing mortars and other installation materials for the Owner's use in replacement and maintenance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Subject to compliance with paragraphs 1.12 and performance requirements, provide products by one of the following manufacturers:

- A. Manufacturers of Thin calcium silicate building stone units having Products considered acceptable for use:
1. Arriscraft International. This is the Basis of Design
 2. Substitution Procedures: refer to Section 01 25 00.
- B. Manufacturers of Adhered Masonry Veneer Installation Materials and Accessories having Products considered acceptable for use:
1. Laticrete International
 2. Substitution Procedures: refer to Section 01 25 00

2.02 ADHERED MASONRY VENEER MATERIALS

- A. Thin Adhered Calcium Silicate Building Stone Masonry Units (Thin Adhered CSMU) (Georgia): to ASTM C73, Grade SW; solid units that have been pressure formed and autoclaved; special shapes as indicated; three-size configuration; as follows:
1. Modular Sizes:
 - a. AS21: 2-1/8" high, random thickness, random lengths.
 - b. AS35: 3-5/8" high, random thickness, random lengths.
 - c. AS56: 5-13/16" high, random thickness, random lengths.
 2. Texture: rugged chiselled finish on exposed faces;
 3. Color: as indicated on architectural elevations.
 4. Product and Manufacturer's Name: ARRIS[®]stack Building Stone by Arriscraft International.

2.03 DRAINAGE MAT

- A. Drainage Mat: Cosella Dorken Delta-Dry to be attached through Laticrete Air and Water Barrier to substrate.
1. Material Thickness (ASTM D1777): 0.022" (0.55mm)
 2. Overall Thickness (D1777): 0.3" (7.53mm)

2.04 CEMENT BOARD

- A. Backer Board: Cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; and complying with ANSI A118.9 and ASTM C 1325 (PermaBase BRAND Cement Board).
1. Thickness: ½ in.
 2. Width: 4 ft.
 3. Length: 8 ft.
 4. Edges: Tapered.
 5. Compressive Strength: Not less than 2250 lbs. per sq. in. when tested in accordance with ASTM D 2394.

6. Water Absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C 473.
- B. Fasteners:
 1. Screws: Drill point screws (No. 8) wafer head, corrosion-resistant, 1-5/8" in length, and complying with ASTM C 1002.
 - C. Joint Treatment:
 1. Tape: Alkali-resistant fiberglass mesh tape intended for use with cement board.
 - D. Bonding Materials:
 1. Mortar: Latex-portland cement mortar in accordance with ANSI A118.4.
- 2.05 ADHERED MASONRY VENEER INSTALLATION MATERIALS AND ACCESSORIES
- A. Air and Water Barrier Membrane: [LATICRETE® Air & Water Barrier](#) ** to be thin, cold applied, single component liquid and load bearing. Waterproofing Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured:
 3. Air Barrier Test (AC 212): Pass
 4. Air Permeance (ASTM E2178): Pass
 5. Elongation @ break (ASTM D751): 20-30%
 6. 7 day Tensile Strength (ANSI A118.10): >265 psi (1.8 MPa)
 7. 7 day Shear Bond Strength (ANSI A118.10) >200 psi (1.4 MPa)
 8. 28 Day Shear Bond Strength (ANSI A118.4): >214 psi (1.48 – 2.4 MPa)
 9. Service Rating (TCA/ASTM C627): Extra Heavy
 10. Total VOC Content: < 0.05 mg/m³

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify site conditions are ready to receive work
- B. Inspect materials for fit and finish prior to installation. Do not set unacceptable units.
- C. Beginning of installation means acceptance of existing conditions.

3.02 CUTTING MASONRY UNITS

- A. Cut masonry units with wet-saw.
- B. Pre-soak units using clean water prior to cutting.
- C. Clean cut units using a stiff fibre brush and clean water. Allow units to surface dry prior to placement.
- D. Finish cut edges to match face when exposed in wall.

3.03 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay building stone units in random bond pattern, to the following percentage ratio, described from smallest to largest sized units: [30:55:15].

3.04 FIELD QUALITY CONTROL

- A. Architect Inspection: Architect will inspect installed masonry and reject masonry that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.

1. Masonry will be inspected to be free of cracks or other blemishes on the finished face or front edges of the masonry units exceeding 3/8 inch or that can be seen from a distance of 10 feet.
 2. Units shall exhibit a texture approximately equal to the approved sample when viewed under diffused daylight illumination at a 20 foot distance.
 3. Minor chipping or breakage resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under diffused daylight illumination from a 20 foot distance.
 4. Efflorescence will not be cause for rejection.
- B. Make Good rejected masonry as directed by Architect.

3.05 ADJUSTING AND CLEANING

- A. Clean masonry units as recommended by the manufacturer.
- B. Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.06 PROTECTION

- A. Protect units from damage resulting from subsequent construction operations.
- B. Use protection materials and methods which will not stain or damage units.
- C. Remove protection materials upon Substantial Completion, or when risk of damage is no longer present.

3.07 SUBSTRATE EXAMINATION

- A. Verify site conditions are ready to receive work.
- B. Inspect finish materials for fit and finish prior to installation. Do not set unacceptable units.
- C. Beginning of installation means acceptance of existing conditions.
- D. Verify that surfaces to be covered with adhered masonry veneer, brick, stone, trim or waterproofing are: Sound, rigid and conform to good design/engineering practices;
 - a. Systems, including the framing system (including lateral bracing, purlins, battens and other framing member stiffeners), flashings, water resistive barriers, air barriers, exterior rated sheathing panels, cement backer unit panels, wire lath over which adhered masonry veneer or stone will be installed shall be in conformance with the International Residential Code (IRC) for residential applications, the International Building Code (IBC) for commercial applications, or applicable building codes. The project design should include the intended use and necessary allowances for the expected live load, concentrated load, impact load, and dead load including the weight of the finish and installation materials while maintaining the maximum allowable deflection standard of L/600 under total anticipated load;
 - b. Clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, efflorescence, form oil, loose plaster, paint, and scale;
 - c. Adhered Masonry Veneer installations have a specified subsurface tolerance, for instance 1/4" in 10' (6mm in 3m) and 1/16" in 1' (1.5mm in 300mm), to conform with the ANSI specifications. Because medium-bed mortars are not intended to be used in truing or leveling the work of others, the subsurface typically should not vary by more than 1/16" over 1' (1.5mm over 300mm), nor more than 1/32" (0.8mm) between adjoining edges where applicable (e.g. between sheets of cement backer board or between adjacent concrete masonry units). Should the architect/designer require a more stringent tolerance (e.g. 1/8" in 10' [3mm in 300mm]), the subsurface specification must reflect that tolerance, or the adhered masonry veneer specification must include a specific and separate requirement to bring the 1/4" (6mm) subsurface tolerance into compliance with the 1/8" (6mm) tolerance desired;
 - d. Not leveled with gypsum or asphalt based compounds;

- e. Dry as per American Society for Testing and Materials (ASTM) D4263 “Standard Test for Determining Moisture in Concrete by the Plastic Sheet Method.”
- E. Concrete surfaces shall also be:
 - a. Cured a minimum of 28 days at 70°F (21°C), including an initial seven (7) day period of wet curing;
- F. Advise General Contractor and Architect of any surface or substrate conditions requiring correction before adhered masonry veneer work commences. *Beginning of work constitutes acceptance of substrate or surface conditions.*

3.08 SURFACE PREPARATION

- A. Install DRAINAGE MAT over the exterior grade primary sheathing and Laticrete Air & Water Barrier or over concrete surfaces and Laticrete Air & Water Barrier. Install in accord with drainage mat manufacturers installation instructions.

- B. CEMENT BACKER UNIT SUBSTRATE
Install exterior rated cement backer units in accord with cement backer unit manufacturer's installation instructions and ANSI A118.11. All elements used in the assembly must be rated for exterior use. Installation of cement backer units and primary sheathing in accordance with design requirements.

3.09 INSTALLATION ACCESSORIES

- A. Install the air and waterproofing membrane in compliance with current revisions of ANSI A108.1 (2.7 Waterproofing) and ANSI A108.13. Review the installation and plan the application sequence. Pre-cut LATICRETE® Waterproofing/Anti-Fracture Fabric (if required), allowing 2" (50mm) for overlap at ends and sides to fit the areas as required. Roll up the pieces for easy handling and placement. Shake or stir LATICRETE Air and Water Barrier before using.
- B. *Pre-Treat Cracks and Joints* - Fill all substrate cracks, cold joints and control joints to a smooth finish using a LATICRETE latex-fortified mortar. Alternatively, a liberal coat* of LATICRETE Air and Water Barrier applied with a paint brush or trowel may be used to fill in non-structural joints and cracks. Apply a liberal coat* of LATICRETE Air and Water Barrier approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.
- C. *Pre-Treat Coves and Floor/Wall Intersections* - Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using a LATICRETE latex-fortified mortar. Alternatively, a liberal coat* of LATICRETE Air and Water Barrier applied with a paint brush or trowel may be used to fill in cove joints and floor/wall transitions <1/8" (3mm) in width. Apply a liberal coat* of LATICRETE Air and Water Barrier approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.
- D. *Main Application* - Allow any pre-treated areas to dry to the touch. Apply a liberal coat* of LATICRETE Air and Water Barrier with a paint brush or heavy napped roller over substrate including pre-treated areas and allow to dry to the touch. Install another liberal coat* of LATICRETE Air and Water Barrier over the first coat. Let the top coat of LATICRETE Air and Water Barrier dry to the touch approximately 1 – 2 hours at 70°F (21°C) and 50% RH. When the top coat has dried to the touch inspect the surface for pinholes, voids, thin spots or other defects. LATICRETE Air and Water Barrier will dry to an olive green color when fully cured. Use additional LATICRETE Air and Water Barrier to seal any defects.
- E. *Treat Penetrations and Flashings* - Allow for a minimum 1/8" (3mm) space between drains, pipes, lights, or other penetrations and surrounding adhered masonry veneer. Flash LATAPOXY Waterproof Flashing Mortar onto and around penetration openings to create a waterproof seal. Bring LATAPOXY Waterproof Flashing Mortar up to the finish level of the adhered masonry veneer, thin brick or stone finish. When LATAPOXY Waterproof Flashing Mortar has dried to the

touch and the finishes have been installed, seal the gap around the penetration with LATICRETE Latasil.

- F. *Movement Joints* - Apply a liberal coat* of LATICRETE Air and Water Barrier, approximately 8" (200mm) wide over the areas. Then embed and loop the 6" (150mm) wide LATICRETE Waterproofing/Anti-Fracture Fabric and allow the LATICRETE Air and Water Barrier liquid to bleed through. Immediately apply a second coat of LATICRETE Air and Water Barrier.
- G. Dry coat thickness is 20 – 30 mil (0.02 - 0.03" or 0.5 - 0.8mm); consumption per coat is approximately 0.01 gal/ft² (approx. 0.4 L/m²); coverage is approximately 100 ft² /gal (approx. 2.5 m²/ L). LATICRETE Waterproofing/Anti-Fracture Fabric can be used to pre-treat cracks, joints, curves, corners, drains, and penetrations with LATICRETE Air and Water Barrier.
- H. *Protection* - Provide protection for newly installed membrane, even if covered with a adhered masonry veneer installation against exposure to rain or other water for a minimum of 2 hours at 70°F (21°C) and 50% RH. For temperatures between 45°F and 69°F (7°C to 21°C) allow a minimum 24 hour cure period.

Use the following LATICRETE System Materials:

- a. *LATICRETE Air and Water Barrier*

3.10 INSTALLATION – ADHERED MASONRY VENEER

- A. *General:* Install in accordance with current versions of American National Standards Institute, Inc. (ANSI) "[A108 American National Standard Specifications for Installation of Ceramic Tile](#)" and TCNA "[Handbook for Ceramic Tile Installation](#)." Cut and fit adhered masonry veneer neatly around corners, fittings, and obstructions. Perimeter pieces to be minimum half unit, brick or stone. Chipped, cracked, split pieces and edges are not acceptable. Make joints even, straight, plumb and of uniform width to tolerance +/- 1/16" over 8' (1.5mm in 2.4m). Install divider strips at junction of flooring and dissimilar materials.
- B. *Pre-float Method:* Over clean, dimensionally stable and sound concrete or masonry substrates, apply thick-bed mortar as scratch/leveling coat in compliance with current revision of A108.1A (1.0, 1.4 & 5.1). Float surface of scratch/leveling coat plumb, true and allow mortar to set until firm. For installation of adhered masonry veneer follow Direct Adhere Method (§ 3.4 D).
- D. *Direct Adhere Method to Install Masonry Veneer:* Install latex portland cement mortar in compliance with current revisions of ANSI A108.02 (3.11), A108.1B and ANSI A108.5. Use the appropriate trowel notch size to ensure proper bedding of the adhered masonry veneer, selected so that 100% coverage of the back surface of the Thin Adhered CSMU is achieved. Work the latex portland cement mortar into good contact with the substrate and comb with notched side of trowel. Spread only as much latex portland cement mortar as can be covered while the mortar surface is still wet and tacky. When installing large format (>8" x 8"/200mm x 200mm) units, spread latex portland cement mortar onto the back of (i.e. 'back-butter') each piece/unit in addition to troweling latex portland cement mortar over the substrate. Beat each piece/unit into the latex portland cement mortar with a beating block or rubber mallet to insure 100% full bedding and flatness. Allow installation to set until firm. Clean excess latex portland cement mortar from adhered masonry veneer face and joints between pieces.
- E. *Pointing Joints*

Polymer Fortified Pointing Mortar - for joint widths $\geq 1/16"$ (1.5mm) and $\leq 1"$ (25mm)]; Allow Thin Adhered CSMU veneer to cure a minimum of 24 hours @ 70° F (21°C). □ Verify grout joints are free of dirt, debris, wedges or spacers. Sponge or wipe dust/dirt off veneer face and remove any water standing in joints. Surface temperature must be between 40-90° F (4-32°C). Pour approximately 4 quarts (3.8 L) of clean, potable water into a clean mixing container. Add a 50 lb. (22.7 kg) bag of LATICRETE Masonry Pointing Mortar to the container while mixing. Mix by hand

or with a slow speed mixer to a smooth, stiff consistency. Install latex fortified cement grout in compliance with current revisions of ANSI A108.1A (7.0), ANSI A108.02 (4.5) and ANSI A108.10. Dampen dry surfaces with clean water.

Place LATICRETE Masonry Pointing Mortar into a high quality masonry mortar pointing bag. Carefully bag the pointing mortar into the joints. Once the mortar has become stiff in the joint, ("thumb-print dry") typically 15-20 minutes after pointing @ 70° F (21°C), using a striking or joint tool, strike the mortar joints to the desired finish/contour. Remove excess mortar using a masonry brush or sponge. Do not over wash the mortar joint.

Higher temperatures may require faster time to initial cleaning; wider joints or lower temperatures may require a longer time to initial cleaning. Allow grout joints to become firm. Inspect joint for pinholes/voids and repair them with freshly mixed grout. Within 24 hours, check for remaining haze and remove it with warm soapy water and a nylon scrubbing pad, using a circular motion, to lightly scrub surfaces and dissolve haze/film. Do not use acid cleaners on latex portland cement grout less than 10 days old.

- F. *Expansion and Control Joints:* Provide control or expansion joints as located in contract drawings and in full conformity, especially in width and depth, with architectural details.
1. Substrate joints must carry through, full width, to surface of adhered masonry veneer.
 2. Install expansion joints in adhered masonry veneer work over construction/cold joints or control joints in substrates.
 3. Install expansion joints where adhered masonry veneer abut restraining surfaces (such as perimeter walls, curbs, columns), changes in plane and corners.
 4. Joint width and spacing depends on application - follow TCNA "[Handbook for Ceramic Tile Installation](#)" Detail "EJ-171 Expansion Joints" or consult sealant manufacturer for recommendation based on project parameters.
 5. Joint width: $\geq \frac{1}{8}$ " (3mm) and ≤ 1 " (25mm).
 6. Joint width: depth ~2:1 but joint depth must be $\geq \frac{1}{8}$ " (3mm) and $\leq \frac{1}{2}$ " (12mm).
 7. Layout (field defined by joints): 1:1 length: width is optimum but must be $\leq 2:1$. Remove all contaminants and foreign material from joint spaces/surfaces, such as dirt, dust, oil, water, frost, setting/grouting materials, sealers and old sealant/backer. Use LATICRETE Latasil™ 9118 Primer for underwater and permanent wet area applications, or for porous stone (e.g. limestone, sandstone etc...) installations. Install appropriate backing material (e.g. closed cell backer rod) based on expansion joint design and as specified in § 07920. Apply masking tape to face of adhered masonry veneer, brick or stone veneer. Use caulking gun, or other applicator, to completely fill joints with sealant. Within 5-10 minutes of filling joint, 'tool' sealant surface to a smooth finish. Remove masking tape immediately after tooling joint. Wipe smears or excess sealant off the face of adhered masonry veneer or other absorptive surfaces immediately.

Use the following LATICRETE System Materials:
LATICRETE® Latasil™
LATICRETE Latasil 9118 Primer

- G. *Adjusting:* Correction of defective work for a period of one (1) year following substantial completion, return to job and correct all defective work. Defective work includes, without limitation, adhered masonry veneer units stones broken in normal abuse due to deficiencies in setting bed, loose grout, and all other defects which may develop as a result of poor workmanship.

3.11 CLEANING

Clean excess mortar/epoxy from veneer surfaces with water before they harden and as work progresses. Do not contaminate open grout/caulk joints while cleaning. Sponge and wash veneers diagonally across joints. Do not use acids for cleaning. Polish with clean dry cloth. Remove surplus materials and leave premises broom clean.

3.12 PROTECTION

- A. Protect finished installation under provisions of §01 05 00 and §01 05 35. Close areas to other trades and traffic until adhered masonry veneer being installed has set firmly. Cure work in swimming pools, fountains and other continuous immersion applications for 14 days for latex portland cement based pointing mortar @ 70°F (21°C) before flood testing or filling installation with water. Extend period of protection of veneer work at lower temperatures, below 60°F (15°C), and at high relative humidity (>70% R.H.) due to retarded set times of mortar/adhesives. Replace or restore work of other trades damaged or soiled by work under this section.

PART 4 – HEALTH AND SAFETY

The use of personal protection such as rubber gloves, suitable dust masks, safety glasses and industrial clothing is highly recommended. Discarded packaging, product wash and waste water should be disposed of as per local, state or federal regulations.

SECTION 05-1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 05-5000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other steel items not defined as structural steel.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.
2. Welded built-up members with plates thicker than 2 inches.
3. Column base plates thicker than 2 inches.

D. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication of structural-steel components.
 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 2. Include embedment Drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 5. Identify members and connections of the seismic-load-resisting system.
 6. Indicate locations and dimensions of protected zones.
 7. Identify demand-critical welds.
 8. Identify members not to be shop primed.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer, fabricator, professional engineer, and testing agency.

1.7 QUALITY ASSURANCE

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Option 1: Connection designs have been completed and connections indicated on the Drawings.
2. Option 2: Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360
 - b. Use Allowable Stress Design; data are given at service-load level.
3. Option 3 and 3A: Design connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer. Member reinforcement at connections is indicated on Drawings.
 - a. Use Allowable Stress Design; data are given at service-load level.

C. Moment Connections: Type PR, partially restrained.

D. Construction: Moment frame, Combined system of moment frame and shear walls

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992.

B. Channels, Angles : ASTM A36.

C. Plate and Bar: ASTM A36, ASTM A572, Grade 50.

D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

2.4 PRIMER

A. Steel Primer:

1. Comply with
2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.5 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.
- F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.
- H. Welded-Steel Door Frames: Build up welded-steel door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than **10 inches** o.c. unless otherwise indicated on Drawings.

- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Snug tightened unless indicated to be Slip critical.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 1. SSPC-SP 2.
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner.
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
 - 1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.

2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 1. Joint Type: Snug tightened unless indicated to be Slip critical.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs [**where indicated**], back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.
- C. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.5 INSTALLATION OF PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with ANSI/AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

3.6 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
 1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

- C. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION 05-1200

SECTION 05-4000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Load-bearing wall framing.
- 2. Exterior non-load-bearing wall framing.

B. Related Requirements:

- 1. Section 05-5000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
- 2. Section 09-2216 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

- 1. Cold-formed steel framing materials.
- 2. Load-bearing wall framing.
- 3. Exterior non-load-bearing wall framing.
- 4. Interior non-load-bearing wall framing.
- 5. Vertical deflection clips.
- 6. Single deflection track.
- 7. Double deflection track.
- 8. Drift clips.
- 9. Floor joist framing.
- 10. Roof-rafter framing.
- 11. Ceiling joist framing.
- 12. Soffit framing.
- 13. Post-installed anchors.
- 14. Power-actuated anchors.
- 15. Sill sealer gasket.
- 16. Sill sealer gasket/termite barrier.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel framing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Certificates: For each type of code-compliance certification for studs and tracks.

D. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

E. Research Reports:

1. For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- E. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Any meeting the requirements of this specification

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01-4000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 1. Design Loads: 15 PSF for metal stud walls sheathed on both faces.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/600 of the wall height.
 - b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of **5 lbf/sq. ft.**
 - c. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height.
 - d. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of **5 lbf/sq. ft.**
 - e. Floor Joist Framing: Vertical deflection of 1/360 for live loads and 1/240 for total loads of the span.
 - f. Roof Rafter Framing: Vertical deflection of 1/360 of the horizontally projected span for live loads.
 - g. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of **120 deg F.**
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of **1 inch.**
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 1. Floor and Roof Systems: AISI S210.
 2. Wall Studs: AISI S211.

3. Headers: AISI S212.
4. Lateral Design: AISI S213.

D. Fire-Resistance Ratings: Comply with ASTM E119; 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 acceptable to authorities having jurisdiction.

2.3 COLD-FORMED STEEL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: 33 ksi for 18 ga. or lighter and 50 ksi or 33 ksi for 16 ga. or heavier.
2. Coating: G60 for metal studs and tracks, G90 for clips and accessories.

B. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: **G90**.

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: **0.0538 inch, 16 gage**.
2. Flange Width: **1-5/8 inches**.
3. Section Properties: As required by structural performance.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: **1-1/4 inches**.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: **1-5/8 inches**.
3. Section Properties: As required by structural performance.

D. Steel Single- or Double-L Headers: Manufacturer's standard L-shapes used to form header beams, of web depths indicated, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Top Flange Width: **1-5/8 inches**.
3. Section Properties: Matching steel studs.

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: **1-5/8 inches**.
 3. Section Properties: As required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs.
 2. Flange Width: **1-1/4 inches**.
- C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs.
 2. Flange Width: 1 inch plus the design gap.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: Matching steel studs.
 - b. Flange Width: 1 inch plus the design gap.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: Matching steel studs.
 - b. Flange Width: 1 inch plus the design gap.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.

4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by [hot-dip process according to ASTM A153/A153M, Class C].
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction,] as appropriate for the substrate.
 1. Uses: Securing cold-formed steel framing to structure.
 2. Type: Torque-controlled expansion anchor, Torque-controlled adhesive anchor, or adhesive anchor.
 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy [Group 1] [Group 2] stainless-steel bolts, ASTM F593, and nuts, ASTM F594.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: MIL-P-21035B or SSPC-Paint 20.
- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sill Sealer Gasket: Closed-cell neoprene foam, **1/4 inch** thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.
- F. Sill Sealer Gasket/Termite Barrier: Minimum **68-mil** nominal thickness, self-adhering sheet consisting of **64 mils** of rubberized asphalt laminated on one side to a **4-mil-** thick, polyethylene-film reinforcement, and with release liner on adhesive side
 - 1. Physical Properties:
 - a. Peel Adhesion: **17.0 lb/in of width** when tested in accordance with ASTM D412.
 - b. Low-Temperature Flexibility: Pass at **minus 25 deg F** ASTM D146/D146M.
 - c. Water Vapor Permeance: **0.05 perm** maximum when tested in accordance with ASTM E96/E96M, Method B.
 - d. Resistance to Termite Penetration: Comply with ICC-ES AC380.

2.9 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of **1/8 inch in 10 feet** and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus **1/8 inch** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of **1/8 inch**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than **1/4 inch** to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.
- E. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding **1/16 inch**.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

- a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INSTALLATION OF LOAD-BEARING WALL FRAMING

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
1. Anchor Spacing: As shown on Shop Drawings.
- B. Squarely seat studs against top and bottom tracks, with gap not exceeding **1/8 inch** between the end of wall-framing member and the web of track.
1. Fasten both flanges of studs to top and bottom tracks.
 2. Space studs as follows:
 - a. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame. Fasten jamb members together to uniformly distribute loads.
 2. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically as indicated on Shop Drawings. Fasten at each stud intersection.
1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to **6 inches** deep.
 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges, and secure solid blocking to stud webs or flanges.
 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION OF EXTERIOR NONLOADBEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
1. Stud Spacing: As indicated on Drawings
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
 4. Connect drift clips to cold-formed steel framing and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than **48 inches** apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within **12 inches** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at centers indicated.

- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Drawings.

- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to studs and anchor to building structure.
 - 4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than **48 inches** apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within **12 inches** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at centers indicated.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.7 INSTALLATION OF JOIST FRAMING

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
 - 1. Install joists over supporting frame with a minimum end bearing of **1-1/2 inches**.
 - 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than **2 inches** from abutting walls, and as follows:
 - 1. Joist Spacing: As indicated on Drawings.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
 - 1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
 - 1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 - 2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.8 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet** and as follows:
 - 1. Space individual framing members no more than plus or minus **1/8 inch** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.9 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05-4000

SECTION 05-5150 – ACCESS LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum access ladders.

1.2 RELATED SECTIONS

- A. None

1.3 REFERENCES

- A. AA – Aluminum Association.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. OSHA 1910.27 – Fixed Ladders.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01-3300.
- B. Product Data: Manufacturer's data sheets on each product.
- C. Shop Drawings:
 - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Provide reaction loads for each hanger and bracket.
- D. Qualification Data:
 - 1. Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.
- E. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors.
- F. Verification Samples: For each finish specified, two samples, minimum size 6 inches (150 mm) square, represent actual product color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
 - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.8 WARRANTY

- A. A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 - 1. Defects in materials and workmanship.
 - 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 - 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting

from the use of ladder products.

1.9 EXTRA MATERIALS

- A. Furnish touchup kit for each type and color of paint finish provided.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: O’Keeffe’s, Inc.; 100 N Hill Drive, Suite 12, Brisbane, CA 94005. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: <http://www.okeeffes.com>.
- B. Substitutions: As per Section 01-2500

2.2 APPLICATIONS/SCOPE

- A. Fixed and Cage Ladder Design:
 - 1. Safety cages are required on ladders over 24 feet
 - 2. Safety cages are required on all ladders in high or hazardous areas.
 - 3. Landing platforms are required at 50 feet (15,240 mm) above the bottom of the ladder.
 - 4. Rail and harness fall arrest system as alternate to safety cage and landing platforms shall be a permissible manufacturer’s option.
 - a. Fixed Ladder Bottom Bracket:
 - b. Bottom floor supported bracket.
 - c. Bottom wall supported bracket.
 - d. Bracket as drawn.
- B. Fixed Access Ladder:
 - 1. Standard Duty Channel Rail. Size to access mezzanine with handrail extensions.
 - a. Model 500 as manufactured by O’Keeffe’s Inc.

2.3 FINISHES

- A. Mill finish. As extruded.

2.4 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.5 FABRICATION

- A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 - 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
- C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
- D. Ship Ladders: Not less than 1-1/4 inches (32mm) high, 4-1/8 inch (105 mm) deep and 2 feet (610 mm) wide; tread spacing shall be 1 foot (305 mm) on center. Handrails shall be aluminum pipe, not less than 1-1/2 inches (38 mm) in diameter with hemispheric end caps.
- E. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
- F. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
- G. Security Doors: Formed 1/8 inch (3 mm) thick aluminum sheet. Security panels shall extend on both sides, perpendicular to the door face, to within 2 inches (51 mm) of the wall. Security door shall be furnished with continuous aluminum piano hinge and heavy duty forged steel locking hasps.
- H. Ship Ladder Seismic Bottom Support: Manufacturer's standard; two isolation bearings per stringer.
- I. Ladder Safety Post: Retractable hand hold and tie off.
- J. Rail and Harness Fall Arrest System: Supplied where specified as alternate to safety cage and landing platforms, in accordance with OSHA regulation 1910.27; permanently mounted to ladder rungs and complete with necessary components.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. All required supporting structure is the responsibility of the GC, notify Architect of unsatisfactory supporting work before proceeding.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.3 PROTECTION

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

END OF SECTION

SECTION 05-5213 - PIPE AND TUBE RAILINGS

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. Aluminum railings.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data:

- 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Expanded metal infill panels.
 - 3. Perforated metal infill panels.
 - 4. Woven-wire mesh infill panels.
 - 5. Fasteners.
 - 6. Post-installed anchors.
 - 7. Handrail brackets.
 - 8. Shop primer.
 - 9. Intermediate coats and topcoats.
 - 10. Bituminous paint.
 - 11. Nonshrink, nonmetallic grout.
 - 12. Anchoring cement.
 - 13. Metal finishes.
 - 14. Paint products.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

- C. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
 2. Fittings and brackets.
 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of connecting and finishing members at intersections.
- D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01-4000 "Quality Requirements," to design railings, including attachment to building construction.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 ALUMINUM RAILINGS

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

- B. Aluminum, General: Provide 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 alloy and temper designated below for each aluminum form required.
- C. Extruded Bars and Tubing: ASTM B221, Alloy 6063-T5/T52.
- D. Extruded Structural and : ASTM B429/B429M, Alloy 6063-T6.
 - 1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.
- E. Drawn Seamless Tubing: ASTM B210/B210M, Alloy 6063-T832.
- F. Plate and Sheet: ASTM B209, Alloy 6061-T6.
- G. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.
- H. Castings: ASTM B26/B26M, Alloy A356.0-T6.

2.4 FASTENERS

- A. Fastener Materials:
 - 1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941, Class Fe/Zn 5 for zinc coating.
 - 2. Aluminum Railing Components: Type 304 stainless steel fasteners.
 - 3. Finish exposed fasteners to match appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 - 3. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.5 MISCELLANEOUS MATERIALS

- A. Handrail Brackets: Cast aluminum center of handrail 2-1/2 inches from face of railing .
- B. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
 - 1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting"." Section 099123 "Interior Painting."
- F. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- G. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- H. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- I. Intermediate Coats and Topcoats: Provide products that comply with Section 099113 "Exterior Painting." Section 099123 "Interior Painting."
- J. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- K. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- L. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.
- M. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- N. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations and where indicated on Drawings, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage , but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
 - 1. Clearly mark units for reassembly and coordinated installation.
 - 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 - 2. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water.
 - 1. Provide weep holes where water may accumulate.
 - 2. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with or nonwelded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint
- I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection, using an epoxy structural adhesive, if this is manufacturer's standard splicing method.
- J. Form changes in direction as follows:
 - 1. By bending or .
 - 2. or .
 - 3. or .
 - 4. By bending to smallest radius that will not result in distortion of railing member.

- K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
 - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 - 2. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

2.7 ALUMINUM FINISHES

- A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Clear Anodic Finish: AAMA 611, AA-M12C22A41 .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
 - 1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations in level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

- A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, attached to post with setscrews.
- C. Leave anchorage joint exposed with anchoring material flush with adjacent surface.
- D. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:
1. For aluminum railings, attach posts as indicated, using fittings designed and engineered for this purpose.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with railing ends and anchored to wall construction with anchors and bolts.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and or .

3.6 REPAIR

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in

3.7 CLEANING

- A. Clean aluminum and by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.8 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05-5213

SECTION 06-1053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood blocking, cants, and nailers.
 - 2. Wood furring and grounds.
 - 3. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 06-1600 "Sheathing."

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NHLA: National Hardwood Lumber Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having

jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.2 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 concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWP.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.3 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than **3/4-inch** nominal thickness.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit 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. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- D. Do not splice structural members between supports unless otherwise indicated.

- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches** o.c.

- F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal** thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than **100 sq. ft.** and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than **20 feet** o.c.

- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 PROTECTION

- A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06-1053

SECTION 06-1600 – SHEATHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Wall sheathing.
- 2. Roof sheathing.

B. Related Requirements:

- 1. Section 06-1053 "Miscellaneous Rough Carpentry" for plywood backing panels.
- 2. Section 07-2500 "Weather Barriers" for water-resistant barrier applied over wall sheathing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review air-barrier and water-resistant glass-mat gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and water-resistant glass-mat gypsum sheathing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

- 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies

with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.

1.5 INFORMATIONAL SUBMITTALS

1.6 QUALITY ASSURANCE

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
 2. Air-Barrier Performance: Air-barrier and water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, shall be capable of performing as a continuous 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, tie-ins to installed waterproofing, tie-ins to other installed air barriers, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 FIRE-RETARDANT-TREATED PLYWOOD, WHERE REQUIRED

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet** beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings.

2.3 WALL SHEATHING

- A. Plywood Sheathing: , Exterior, Structural I sheathing.
 - 1. Span Rating: Not less than 20/0.
 - 2. Nominal Thickness: Not less than **1/2 inch**.

- B. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [CertainTeed Corporation](#).
 - b. [Georgia-Pacific Gypsum LLC](#).
 - c. [USG Corporation](#).
 - 2. Type and Thickness: Regular, **1/2 inch** thick.

2.4 ROOF SHEATHING

- A. Plywood Sheathing: , Exterior, Structural I sheathing.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: Not less than **3/4 inch**.

2.5 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.

- B. Nails, Brads, and Staples: ASTM F 1667.

- C. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

- D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 - 1. For steel framing less than **0.0329 inch** thick, use screws that comply with ASTM C 1002.

2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.6 MISCELLANEOUS MATERIALS

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 3. ICC-ES evaluation report for fastener.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall parapet 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.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Screw to cold-formed metal framing.
 - b. Space panels **1/8 inch** apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a **3/8-inch** gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a **1/4-inch** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately **8 inches** o.c. and set back a minimum of **3/8 inch** from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately **8 inches** o.c. and set back a minimum of **3/8 inch** from edges and ends of panels.

2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

3.4 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing and Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier and water-resistant glass-mat gypsum sheathing, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 3. Termination mastic has been applied on cut edges.
 4. Strips and transition strips have been firmly adhered to substrate.
 5. Compatible materials have been used.
 6. Transitions at changes in direction and structural support at gaps have been provided.
 7. Connections between assemblies (sheathing and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 8. All penetrations have been sealed.

END OF SECTION 06-1600

SECTION 06-1753 – SHOP-FABRICATED WOOD TRUSSES

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. Wood roof trusses.

1.3 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification from treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.
- B. Shop Drawings: Show fabrication and installation details for trusses.
1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 2. Indicate sizes, stress grades, and species of lumber.
 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses 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. Qualification Data: For metal connector-plate manufacturer, professional engineer and fabricator.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated lumber.
 2. Fire-retardant-treated wood.
 3. Metal-plate connectors.
 4. Metal truss accessories.

1.6 QUALITY ASSURANCE

- A. Metal Connector–Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality–control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality–assurance program, complies with quality–control procedures in TPI 1, and involves third–party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction] and is certified for chain of custody by an FSC–accredited certification body.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire–retardant–treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01-4000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
 - 1. Design Loads: As indicated.
 - 2. Maximum Deflection under Design Loads:
 - a. Roof Trusses: Vertical deflection of 1/360 of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (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, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal (38 by 140 mm actual) for top chords 2 by 6 inches nominal (38 by 140 mm actual) for bottom chords.
- C. Minimum Specific Gravity for Top Chords: 0.50.

- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06-1000 "Rough Carpentry." Section 06-1053 "Miscellaneous Rough Carpentry."

2.3 METAL CONNECTOR PLATES

- A. General: Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - 1. Use for wood-preserved-treated lumber and where indicated.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
- B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
1. Use for wood-preservative-treated lumber and where indicated.
- D. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick. Tie fastens to one side of truss, top plates, and side of stud below.
- E. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches (63 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.
- F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- G. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches (38 mm) wide by 1 inch (25 mm) deep by 0.040 inch (1.0 mm) thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.
- H. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.
1. Angle clip is 3 by 3 by 0.179 by 8 inches (76 by 76 by 4.55 by 203 mm) with extended leg 8 inches (203 mm) long. Connector has galvanized finish.
 2. Angle clip is 3 by 3 by 0.239 by 10-1/2 inches (76 by 76 by 6.07 by 267 mm) with extended leg 10-1/2 inches (267 mm) long. Connector has painted finish.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.8 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
 - 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
 - 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses 16 inches (406 mm) o.c. 24 inches (610 mm) o.c.; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry" and Section 061053 "Miscellaneous Rough Carpentry."
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.

- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
 - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A 780/A 780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION 06-1753

SECTION 06-4023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standing and running trim, wainscot and ceiling.
2. Closet and utility shelving.
3. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
4. Shop finishing of interior architectural woodwork.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.

1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wood-Preservative Treatment:
 - a. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - b. Indicate type of preservative used and net amount of preservative retained.
 - c. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.
2. Waterborne Treatments: For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Shop Drawings:

1. Include the following:
 - a. Dimensioned plans, elevations, and sections.

- b. Attachment details.
 2. Show large-scale details.
 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
 4. Apply WI Certified Compliance Program label to Shop Drawings.
 - C. Samples for Verification: For the following:
 1. Lumber for Transparent Finish: Not less than **5 inches** wide by **12 inches** long , for each species and cut, finished on one side and one edge.
 2. Veneer Leaves: Representative of and selected from flitches to be used for transparent-finished interior architectural woodwork.
 3. Lumber and Panel Products with Shop-Applied Opaque Finish: **5 inches** wide by **12 inches** long for lumber and **8 by 10 inches** for panels, for each finish system and color.
 - a. Finish entire exposed surface.
- 1.5 INFORMATIONAL SUBMITTALS
 - A. Qualification Data: For and .
 - B. Evaluation Reports: For and wood materials, from ICC-ES.
- 1.6 CLOSEOUT SUBMITTALS
 - A. Quality Standard Compliance Certificates: certificates.
- 1.7 QUALITY ASSURANCE
 - A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- 1.8 DELIVERY, STORAGE, AND HANDLING
 - A. Comply with the Architectural Woodwork Standards, Section 2.
 - B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork + have been completed in installation areas.
 - C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
 1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.
- 1.9 FIELD CONDITIONS
 - A. Environmental Limitations without Humidity Control: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and

maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.

- B. Environmental Limitations with Humidity Control: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 ARCHITECTURAL WOODWORK MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

2.3 ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from WI certification program indicating that woodwork and installation complies with requirements of grades specified.
 - a. This project has been registered with AWI as AWI Quality Certification Program Number .
 - 2. The Contract Documents contain requirements that are more stringent than the Architectural Woodwork Standards. Comply with Contract Documents and Architectural Woodwork Standards.

2.4 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Architectural Woodwork Standards Grade: Custom .
- B. Hardwood Lumber:
 - 1. Wood Species and Cut: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building unless otherwise indicated.
 - 2. Species: Red oak or White oak .
 - 3. Cut: Plain sliced/plain sawn .
 - 4. Wood Moisture Content: 8 to 13 percent.
 - 5. Provide split species on trim that faces areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.
 - 6. For trim items other than base wider than available lumber, use veneered construction. Do not glue for width.
 - a. For veneered base, use hardwood lumber core, glued for width.
 - 7. For base wider than available lumber, glue for width. Do not use veneered construction.
 - 8. For rails thicker than available lumber, use veneered construction. Do not glue for thickness.

2.5 CLOSET AND UTILITY SHELVING

- A. Architectural Woodwork Standards Grade: Custom .
- B. Shelf Material: **3/4-inch** veneer-faced panel product with veneer edge banding .
- C. Cleats: **3/4-inch** solid lumber .
- D. Wood Species: Eastern white pine, sugar pine, or western white pine .
- E. Metal Closet Rods: **1-5/16-inch-** diameter, chrome-plated-steel tubes complying with BHMA A156.16, L03131.
- F. Metal Rod Flanges: Chrome-plated steel .
- G. Wood Finish: Opaque .

2.6 INTERIOR WOOD STAIRS AND RAILINGS

- A. Architectural Woodwork Standards Grade: Custom .
- B. Wood for Opaque Finish:
 - 1. Species: Any closed-grain hardwood .
 - 2. Wood Moisture Content: 8 to 13 percent.
- C. Finishes for Stair Parts:
 - 1. Treads: Opaque.
 - 2. Risers: Opaque.
 - 3. Stringers: Opaque.

4. Scotia, Cove, and Other Moldings: Opaque.
 5. See finish schedule for other finishes
- D. Handrail Brackets: Cast aluminum with wall flange drilled and tapped for concealed hanger bolt and with support arm for screwing to underside of rail. Size to provide **1-1/2-inch** clearance between handrail and face of wall.
- E. Handrail/Bumper Rail Brackets: Pairs of extruded-aluminum channels: one for fastening to back of rail and one for fastening to face of wall, assembled in overlapping fashion and fastened together at top and bottom with self-tapping screws. Size to provide **1-1/2-inch** clearance between handrail and wall.

2.7 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber , kiln-dried to less than 15 percent moisture content.
1. Preservative Treatment: Provide softwood lumber treated by pressure process, AWPA U1; Use Category UC3b.
 - a. Provide where in contact with concrete or masonry .
 - b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - c. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - d. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.
 2. Fire-Retardant Treatment: Complying with requirements; provide where indicated .

2.8 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
1. Ease edges to radius indicated for the following:
 - a. Edges of Solid-Wood (Lumber) Members: **1/16 inch** unless otherwise indicated.
 - b. Edges of Rails and Similar Members More Than **3/4 Inch** Thick: **1/8 inch**.
- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
1. Disassemble components only as necessary for shipment and installation.
 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 3. Notify Architect seven days in advance of the dates and times interior architectural woodwork fabrication will be complete.
 4. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.
 - a. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
 - b. Verify that parts fit as intended, and check measurements of assemblies against field measurements indicated on approved Shop Drawings before disassembling for shipment.
- D. Stairs: Cut rough carriages to accurately fit treads and risers.

1. Glue treads to risers, and glue and nail treads and risers to carriages.
2. House wall and face stringers, and glue and wedge treads and risers.
3. Fabricate stairs with treads and risers no more than **1/8 inch** from indicated position and no more than **1/16 inch** out of relative position for adjacent treads and risers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 1. Shim as required with concealed shims.
 2. Install level and plumb to a tolerance of **1/8 inch in 96 inches**.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 1. Secure with countersunk, concealed fasteners and blind nailing.
 2. Use fine finishing nails for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 3. For shop-finished items, use filler matching finish of items being installed.
- F. Standing and Running Trim:
 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 2. Do not use pieces less than **36 inches** long, except where shorter single-length pieces are necessary.
 3. Scarf running joints and stagger in adjacent and related members.
 4. Fill gaps, if any, between top of base and wall with plastic wood filler; sand smooth; and finish same as wood base if finished .
 5. Install standing and running trim with no more variation from a straight line than **1/8 inch in 96 inches**.

- G. Stairs: Securely anchor carriages to supporting substrates.
1. Install stairs with treads and risers no more than **1/8 inch** from indicated position.
 2. Secure with countersunk, concealed fasteners and blind nailing.
 3. Use fine finishing nails for exposed fastening, countersunk and filled flush with wood surface.
- H. Railings:
1. Install rails with no more than **1/8 inch in 96-inch** variation from a straight line.
 2. Stair Rails: Glue and dowel or pin balusters to treads and railings, and railings to newel posts.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails for exposed fastening, countersunk and filled flush with wood surface.
 3. Wall Rails: Support rails on wall brackets securely fastened to wall framing.
 - a. Space rail brackets not more than o.c.

3.3 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects and to result in interior architectural woodwork being in compliance with requirements of Architectural Woodwork Standards for the specified grade.
- B. Where not possible to repair, replace defective woodwork.
- C. Shop Finish: Touch up finishing work specified in this Section after installation of interior architectural woodwork.
1. Fill nail holes with matching filler where exposed.
 2. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- D. Field Finish: See Section 099123 "Interior Painting" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.4 CLEANING

- A. Clean interior architectural woodwork on exposed and semiexposed surfaces.

END OF SECTION 06-4023

SECTION 06-4116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Plastic-laminate-faced architectural cabinets.

B. Related Requirements:

- 1. Section 06-1000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

- 1. Show details full size.
- 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
- 3. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.

B. Samples for Verification:

- 1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
- 2. Thermoset decorative panels, 8 by 10 inches, for each color, pattern, and surface finish, with edge banding on one edge.

3. Corner pieces as follows:
 - a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
4. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products to meet AWI's Quality Certification standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 087111 "Door Hardware (Descriptive Specification)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 – PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGL.
 - 2. Vertical Surfaces: Grade VGS.
 - 3. Edges: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
 - 4. Pattern Direction: As indicated or directed by Architect.
- G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
 2. Drawer Sides and Backs: Solid-hardwood lumber.
 3. Drawer Bottoms: Hardwood plywood.
- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by laminate manufacturer's designations.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Softwood Plywood: DOC PS 1.
 2. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, 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.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- C. Wire Pulls: Back mounted, solid metal, 5 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- E. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.
- F. Drawer Slides: BHMA A156.9.
 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel with polymer rollers.
 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
 4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.

5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.
- G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 1. Satin Stainless Steel: BHMA 630.
- H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

- A. Fabricate cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches .
- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1. Use filler matching finish of items being installed.
- F. 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. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06-4116

SECTION 07-1120 – UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

- A. Products supplied under this section:
 - 1. Vapor barrier, seam tape, and mastic for installation under concrete slabs.
- B. Related sections:
 - 1. Section 03 30 00 Cast-in-Place Concrete

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
 - 2. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
 - 3. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
 - 4. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
 - 5. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- B. American Concrete Institute (ACI):
 - 1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

- A. Quality control/assurance:
 - 1. Summary of test results as per paragraph 8.3 of ASTM E 1745.
 - 2. Manufacturer's samples, literature.
 - 3. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Vapor barrier must have all of the following qualities:
 - 1. Permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.
 - 2. Other performance criteria:
 - a. Strength: ASTM E 1745 Class A.
 - b. Thickness: 15 mils minimum

- B. Vapor barrier products:
 - 1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Substitutions as per Section 01-2500.

2.2 ACCESSORIES

- A. Seam tape:
 - 1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

- B. Vapor-proofing mastic:
 - 1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ensure that base material is approved by Architect or Geotechnical Engineer.
 - 1. Level and compact base material.

3.2 INSTALLATION

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.
 - 2. Lap vapor barrier over footings and/or seal to foundation walls.
 - 3. Overlap joints 6 inches and seal with manufacturer's tape.
 - 4. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
 - 6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

SECTION 07-1416 - COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied rubberized asphalt waterproofing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1. Review waterproofing requirements including, but not limited to, the following:
 - a. Surface preparation specified in other Sections.
 - b. Minimum curing period.
 - c. Forecasted weather conditions.
 - d. Special details and sheet flashings.
 - e. Repairs.
 - f. Field quality control.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.

1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
 2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.7 WARRANTY

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

PART 2 - PRODUCTS

2.1 COLD-APPLIED RUBBERIZED ASPHALT WATERPROOFING

- A. Single-Component, Rubberized Asphalt Waterproofing: Water-based, polymer-modified rubberized asphalt complying with ASTM C836/C836M, with the following properties measured in accordance with standard test methods referenced:
1. Elongation at Break: 360 percent minimum; ASTM D412.
 2. Water Vapor Permeance: 0.03 perm(1.72 ng/Pa x s x sq. m), maximum, ASTM E96/E96M.
 3. Hydrostatic-Head Resistance: 100 psi average; ASTM D5385.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates in accordance with manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.
 - 1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate in accordance with ASTM D4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces in accordance with ASTM D4258.
- E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

- A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners in accordance with waterproofing manufacturer's written instructions and to recommendations in ASTM C898/C898M and ASTM C1471/C1471M.
- B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrate in accordance with waterproofing manufacturer's written instructions and to recommendations in ASTM C898/C898M and ASTM C1471/C1471M. Before coating surfaces, remove dust and dirt from joints and cracks in accordance with ASTM D4258.
 - 1. Comply with ASTM C1193 for joint-sealant installation.
 - 2. Apply bond breaker on sealant surface, beneath preparation strip.
 - 3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least **6 inches** wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.
- B. Install sheet flashing and bond to deck and wall substrates where required in accordance with waterproofing manufacturer's written instructions.
 - 1. Extend sheet flashings for **4 inches** onto perpendicular surfaces and items penetrating substrate.

3.5 INSTALLATION OF WATERPROOFING

- A. Apply waterproofing in accordance with manufacturer's written instructions and to recommendations in ASTM C1471/C1471M.
- B. Start installing waterproofing in presence of manufacturer's technical representative.
- C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.
- D. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.
 - 1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a dry film thickness of **90 mils**.
 - 2. Apply waterproofing to prepared wall terminations and vertical surfaces.
 - 3. Verify manufacturer's recommended wet film thickness of waterproofing every **100 sq. ft.**
- E. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.
 - 1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of **70 mils**.
 - 2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
 - 3. Verify manufacturer's recommended wet film thickness of waterproofing every **100 sq. ft.**
- F. Cure waterproofing, taking care to prevent contamination and damage during application and curing.
- G. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
 - 1. For horizontal applications, install protection course loose laid over fully cured membrane.
 - 2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.
 - 3. Thermal insulation specified in Section 072100 "Thermal Insulation" may be used in place of a separate protection course for vertical applications when approved in writing by waterproofing manufacturer.

3.6 PROTECTION

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

END OF SECTION 07-1416

SECTION 07-2100 – THERMAL INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Polyisocyanurate foam-plastic board.
2. Glass-fiber blanket.

B. Related Requirements:

1. Section 06-1600 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
2. Section 07-2129 "Foamed-in-Place Insulation" for spray-applied polyurethane foam insulation.
3. Section 07-5216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing" for insulation specified as part of roofing construction.
4. Section 09-2900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

THERMAL INSULATION

- B. Protect foam-plastic board insulation as follows:
1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 – PRODUCTS

2.1 POLYISOCYANURATE FOAM-PLASTIC BOARD

- A. Polyisocyanurate Board, Glass-Fiber-Mat Faced: ASTM C 1289, glass-fiber-mat faced, Type II, Class 2.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced (at wall cavities and furring): ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Knauf Insulation.
 - c. Owens Corning.
- B. Glass-Fiber Blanket, Foil Faced (at roof trusses): 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.

THERMAL INSULATION

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Knauf Insulation.
 - c. Owens Corning.

2.3 ACCESSORIES

- A. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.
- B. It is the responsibility of the General Contractor to create a continuous thermal envelop at the perimeter of the building using all the materials specified or additional materials if not specified.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

THERMAL INSULATION

3.3 INSTALLATION OF SLAB INSULATION

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
 - 2. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
 - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
 - 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

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

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain **3-inch** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed **96 inches**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately **2.5 lb/cu. ft.**
 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07-2100

SECTION 07-2129 – SPRAY FOAM INSULATION

GENERAL

1.1 SECTION INCLUDES

- A. Closed Cell Spray Foam Insulation.

1.2 RELATED SECTIONS

- A. Section 07-2726 – Fluid-Applied Membrane Air Barriers .
- B. Section 07-4663 – Fabricated Panel Assemblies.

1.3 REFERENCES

- A. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM C 177 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- C. ASTM C 1338 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- D. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E 283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- G. ASTM D 1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- H. ASTM D 1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- I. ASTM D 1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

- J. ASTM D 2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- K. ASTM D 2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.

1.4 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.

1.5 SUBMITTALS

- A. 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.
- B. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum of ten years experience manufacturing products in this section shall provide all products listed.
- B. Installer Qualifications: Products listed in this section shall be installed by a single organization with at least five years experience successfully installing insulation on projects of similar type and scope as specified in this section.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect. Mock up may become part of the work.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Storage: Store materials in dry locations with adequate ventilation, protected

from freezing rain, direct sunlight and excess heat and in such a manner to permit easy access for inspection and handling. Store at temperature between 55 and 80 degrees F (12.7 to 26.6 degrees C).

- C. Handling: Handle materials to avoid damage.

1.8 PRE-APPLICATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.9 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply insulation when substrate temperatures are under 40 degrees F (4.4 degrees C) prior to installation.
- C. Surfaces must be dry prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure.
- D. To avoid overspray, product should not be applied when conditions are windy.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: CertainTeed Corp., Insulation Group, which is located at: 750 E. Swedesford Rd. P. O. Box 860 ; Valley Forge, PA 19482-0860; Toll Free Tel: 800-233-8990;
- B. Requests for substitutions will be considered in accordance with provisions of Section 01.

2.2 SPRAY FOAM INSULATION

- A. Insulation: HFC-blown type Closed Cell Foam: CertainTeed CertaSpray Closed Cell Foam is a medium-density, MDI-based polyurethane thermoset rigid foam. When CertaSpray A-side closed cell is mixed with CertaSpray B-

side closed cell under pressure in a 1:1 volumetric ratio, they react and expand into a medium-density closed cell foam with an in-place core density of 1.9– 2.2 pcf:

1. Physical and Mechanical Properties:
 - a. Core Density: 1.9–2.4 pcf when tested in accordance with ASTM D 1622.
 - b. Thermal Resistance (aged): 5.8 less than or equal to 2–1/2 inches / 6.4 when greater than 2–1/2 inches when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
 - c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
 - d. Closed Cell Content: 88–95 percent when tested in accordance with ASTM D 2842.
 - e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D 1621.
 - f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
 - g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
 - h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75 degrees F/95 percent RH, 28 Day.
 - i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
 - j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m².
 - k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.
2. Fire performance
 - a. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.
 - b. Smoke: Less than 450 when tested in accordance with ASTM E 84.
3. Thermal Performance (aged): Tested in accordance with ASTM C 518 and/or ASTM C 177 at 75 degrees F (24 degrees C) mean temperature.
 - a. Thickness 1 inch (25 mm), R-Value 5.8 (h-ft²-degreesF)/Btu (1.0 (m²-degreesC)/W).
 - b. Thickness 1–1/2 inches (38 mm), R-Value 8.7 (h-ft²-degreesF)/Btu (1.5 (m²-degreesC)/W).
 - c. Thickness 2 inches (51 mm), R-Value 11.6 (h-ft²-degreesF)/Btu

- (2.0 (m²-degreesC)/W).
- d. Thickness 2-1/2 inches (64 mm), R-Value 16.0 (h-ft²-degreesF)/Btu (2.8 (m²-degreesC)/W).
 - e. Thickness 3 inches (76 mm), R-Value 19.2 (h-ft²-degreesF)/Btu (3.4 (m²-degreesC)/W).
 - f. Thickness 3-1/2 inches (89 mm), R-Value 22.4 (h-ft²-degreesF)/Btu (3.9 (m²-degreesC)/W).
 - g. Thickness 4 inches (102 mm), R-Value 25.6 (h-ft²-degreesF)/Btu (4.5 (m²-degreesC)/W).
 - h. Thickness 4-1/2 inches (114 mm), R-Value 28.8 (h-ft²-degreesF)/Btu (5.1 (m²-degreesC)/W).
 - i. Thickness 5 inches (127 mm), R-Value 32.0 (h-ft²-degreesF)/Btu (5.6 (m²-degreesC)/W).
 - j. Thickness 5-1/2 inches (140 mm), R-Value 35.2 (h-ft²-degreesF)/Btu (6.2 (m²-degreesC)/W).
 - k. Thickness 6 inches (152 mm), R-Value 38.4 (h-ft²-degreesF)/Btu (6.8 (m²-degreesC)/W).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction has been completed to the point where the insulation may correctly be installed.
- C. Verify that substrate and cavities are dry and free of any foreign material that will impede application.
- D. Verify that mechanical and electrical services in ceilings, walls and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

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

- C. Mask and protect adjacent surfaces from overspray or dusting.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Product must be installed according to local code, and must be applied by a qualified applicator.
- B. Apply insulation by spray method, to uniform monolithic density without voids.
- C. Apply to minimum cured thickness as indicated on the Drawings at cavity walls and metal decks.
- D. Apply to minimum cured thickness of 5 inches under second floor slabs as indicated in drawings.
- E. Apply insulation to seal voids at truss ends to prevent wind scouring of ceiling insulation.
- F. Seal plumbing stacks, electrical wiring and other penetrations into attic to control air leakage.
- G. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180 degrees F (82 degrees C) or greater.
- H. Where building is designed to meet the specific air tightness standards of the Energy Star Program, apply insulation as recommended by manufacturer to provide airtight construction. Apply sealant to joints between structural assemblies as specified in Division 7.
- I. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

- A. Inspection will include verification of insulation and density.

3.5 PROTECTION

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

END OF SECTION

SECTION 07-2419 – EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART I GENERAL

1.01 SUMMARY

A. This document is to be used for the installation of exterior insulation and finish systems.

B. Related Sections

1. Light Gauge Cold Formed Steel Framing – Section 05-4000
2. Sheathing – Section 06-1600
3. Sealant – Section 07-9000
4. Flashing – Section 07-6000

1.02 REFERENCES

A. Section Includes

1. ASTM B 117 (Federal Test Standard 141A Method 6061) Standard Practice for Operating Salt Spray (Fog) Apparatus
2. ASTM C 150 Standard Specification for Portland Cement
3. ASTM C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
4. ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
5. ASTM C 1396 (formerly C 79) Standard Specification for Gypsum Board
6. ASTM D 968 (Federal Test Standard 141A Method 6191) Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
7. ASTM D 2247 (Federal Test Standard 141A Method 6201) Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
8. ASTM D 2898 Standard Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing
9. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
10. ASTM D 4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
11. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
12. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
13. ASTM E 119 Standard Method for Fire Tests of Building Construction and Materials
14. ASTM E 283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen

15. ASTM E 330 Test Method for Structural Performance of Exterior Windows, Doors and Curtain Walls by Uniform Static Air Pressure Difference
16. ASTM E 331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
17. ASTM E 2098 Test Method for Determining the Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for use in Class PB Exterior Insulation and Finish Systems (EIFS), after Exposure to Sodium Hydroxide Solution
18. ASTM E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of Exterior Insulation and Finish Systems (EIFS)
19. ASTM E 2178 Standard Test Method for Air Permeance of Building Materials
20. ASTM E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies
21. ASTM E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
22. ASTM E 2430 Standard Specification for Expanded Polystyrene (EPS) Thermal Insulation Boards for use in Exterior Insulation and Finish Systems (EIFS)
23. ASTM E 2485 (formerly EIMA Std. 101.01) Standard Test Method for Freeze-Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water-Resistive Barrier Coatings
24. ASTM E 2486 (formerly EIMA Std. 101.86) Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)
23. ASTM E 2568 Standard Specification for PE Exterior Insulation and Finish Systems
24. ASTM E 2570 Standard Test Method for Evaluating Water-Resistive Barrier (WRB) Coatings Used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage
25. ASTM G 155 (Federal Test Standard 141A Method 6151) Standard Practice for Operating-Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials
26. DS131, Dryvit Expanded Polystyrene Insulation Board Specification
27. DS151, Custom Brick™ Polymer System Specifications for Use On Vertical Walls
28. DS152, Dryvit Cleaning and Recoating
29. DS153, Dryvit Expansion Joints and Sealants
30. DS159, Dryvit Water Vapor Transmission
31. DS456, Rapidry DM™ 35-50 or DS457, Rapidry DM™ 50-75 Data Sheets
32. DS494, Dryvit AquaFlash® System
33. DS704, Backstop® DMS
34. DS705, Reflectit™
35. DS706, Mojave E™ Finish
36. Mil Std E5272 Environmental Testing
37. Mil Std 810B Environmental Test Methods
38. NFPA 268 Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.

39. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus

1.03 DEFINITIONS

- A. Base Coat: Material used to encapsulate one or more layers of reinforcing mesh fully embedded that is applied to the outside surface of the EPS.
- B. Building Expansion Joint: A joint through the entire building structure designed to accommodate structural movement.
- C. Contractor: The contractor that installs the EIFS System to the substrate.
- E. Expansion Joint: A structural discontinuity in the EIFS System.
- F. Finish: An acrylic-based coating, available in a variety of textures and colors that is applied over the base coat.
- G. Insulation Board: Expanded polystyrene (EPS) insulation board, which is affixed to the substrate and creates a layer of continuous insulation.
- H. Panel Erector: The contractor who installs the panelized EIFS System.
- I. Panel Fabricator: The contractor who fabricates the panelized EIFS System.
- J. Reinforcing Mesh: Glass fiber mesh(es) used to reinforce the base coat and to provide impact resistance.
- K. Sheathing: A substrate in sheet form.
- L. Substrate: The material to which the EIFS System is affixed.
- M. Substrate System: The total wall assembly including the attached substrate to which the EIFS System is affixed.

1.04 SYSTEM DESCRIPTION

- A. General: The EIFS System is an Exterior Insulation and Finish System (EIFS), Class PB, with capability for moisture drainage. The system consists of an air/water-resistive barrier coating, an adhesive, grooved expanded polystyrene insulation board, internal vinyl tracks, Vent Assembly, Starter Strip, base coat, reinforcing mesh(es) and finish.
- B. Methods of Installation
 - 1. Field Applied: The EIFS System is applied to the substrate system in place.
- C. Design Requirements:
 - 1. Acceptable substrates for the EIFS System shall be:
 - a. Exterior grade gypsum sheathing meeting ASTM C 1396 (formerly C 79) requirements for water resistant core or Type X core at the time of application of the EIFS System.

- b. Exterior sheathing having a water-resistant core with fiberglass mat facers meeting ASTM C 1177.
 - c. Exterior fiber reinforced cement or calcium silicate boards.
 - d. APA Exterior or Exposure 1 Rated Plywood, Grade C-D or better, nominal 13 mm (1/2 in) minimum 4-ply.
 - e. Exterior grade fire retardant treated (FRT) plywood.
 - f. APA Exposure 1 Rated Oriented Strand Board (OSB) nominal 11.1 mm (7/16 in) minimum
 - g. Unglazed brick, cement plaster, concrete or masonry.
2. Deflection of the substrate systems shall not exceed 1/240 times the span.
 3. The substrate shall be flat within 6.4 mm (1/4 in) in a 1.2 m (4 ft) radius.
 4. The slope of inclined surfaces shall not be less than 6:12, and the length shall not exceed 305 mm (12 in).
 5. All areas requiring an impact resistance classification higher than "standard", as defined by ASTM E 2486 (formerly EIMA Standard 101.86), shall be as detailed in the drawings and described in the contract documents. Refer to Section 1.04.D.1.d of this specification.
 6. Expansion Joints:
 - a. Design and location of expansion joints in the EIFS System is the responsibility of the project designer and shall be noted on the project drawings. As a minimum, expansion joints shall be placed at the following locations:
 - 1) Where expansion joints occur in the substrate system.
 - 2) Where building expansion joints occur.
 - 3) At floor lines in wood frame construction.
 - 4) At floor lines of non-wood framed buildings where significant movement is expected.
 - 5) Where the EIFS System abuts dissimilar materials.
 - 6) Where the substrate type changes.
 - 7) Where prefabricated panels abut one another.
 - 8) In continuous elevations at intervals not exceeding 23 m (75 ft).
 - 9) Where significant structural movement occurs, such as changes in roof line, building shape or structural system.
 7. Terminations
 - a. Prior to applying the EIFS System, wall openings shall be treated with Flashing Tape.
 - b. The EIFS System shall be held back from adjoining materials around openings and penetrations such as windows, doors, and mechanical equipment a minimum of 19 mm (3/4 in) for sealant application.
 - c. The system shall be terminated a minimum of 203 mm (8 in) above finished grade.
 - d. Sealants
 - 1) Shall be manufactured and supplied by others.
 - 2) Shall be compatible with the EIFS System materials.

- 3) The sealant backer rod shall be closed cell.
- 8. Vapor Retarders: The use and location of vapor retarders within a wall assembly is the responsibility of the project designer and shall comply with local building code requirements. The type and location shall be noted on the project drawings and specifications. Vapor retarders may be inappropriate in certain climates and can result in condensation within the wall assembly.
- 9. Dark Colors: The use of dark colors must be considered in relation to wall surface temperature as a function of local climatic conditions. Use of dark colors in high temperature climates can affect the performance of the system.
- 10. Flashing: Shall be provided at all roof-wall intersections, windows, doors, chimneys, decks, balconies and other areas as necessary to prevent water from entering behind the EIFS System.

D. Performance Requirements:

- 1. The EIFS System shall have been tested as follows:
 - a. Air/Water-Resistive Barrier Coating

TEST	TEST METHOD	CRITERIA	RESULTS
Tensile Bond	ASTM C 297/E 2134 ICC ES (AC 212)*	Minimum 104 kPa (15 psi)	Substrate: Min. 131 kPa (19 psi) (Backstop NT) Min. 106 kPa (15.4 psi) (Backstop DMS) Flashing: Min 2970 kPa (431 psi) (Backstop NT) Min. 967 kPa (140 psi) (Backstop DMS)
Freeze-thaw	ASTM E 2485/ICC-ES Proc. ICC ES (AC 212)*	No deleterious effects after 10 cycles	Passed – No deleterious effects after 10 cycles
Water Resistance	ASTM D 2247 ICC ES (AC 212)*	No deleterious effects after 14 days exposure ¹	No deleterious effects after 14 days exposure
Water Vapor Transmission	ASTM E 96 Proc. B ICC ES (AC 212)*	Vapor Permeable	7 perms (Backstop NT) ² 20 perms (Backstop DMS)
Air Leakage	ASTM E 283	No ICC or ANSI/EIMA Criteria	0.01 l/sec/m ² (0.002 cfm/ft ²) (Backstop NT)
Air Permeance	ASTM E 2178	No ICC or ANSI/EIMA Criteria	0.0006 l/s/m ² @ 75Pa (1.2x10 ⁻⁴ cfm/ft ² @1.6 psf) (Backstop NT)
Air Barrier	ASTM E 2357	No ICC or ANSI/EIMA	0.05 l/sec m ² @300 Pa

Assembly		Criteria	(<0.001 cfm/ft ² @ 6.24 psf) (Backstop NT)
Structural Performance	ASTM E 1233 Proc. A ICC ES (AC 212)*	Minimum 10 positive cycles at 1/240 deflection; No cracking in field, at joints or interface with flashing	Passed
Racking	ASTM E 72 ICC ES (AC 212)*	No cracking in field, at joints or interface with flashing at net deflection of 3.2 mm (1/8 inch)	Passed
Restrained Environmental	ICC-ES Procedure ICC ES (AC 212)*	5 cycles; No cracking in field, at joints or interface with flashing	Passed
Water Penetration	ASTM E 331 ICC ES (AC 212)*	No water penetration beyond the inner-most plane of the wall after 15 minutes at 137 Pa (2.86 psf)	Passed
Weathering UV Exposure	ICC ES Proc. ICC ES (AC 212)*	210 hours of exposure	Passed
Accelerated Aging	ICC ES Proc. ICC ES (AC 212)*	25 cycles of wetting and drying	Passed
Hydrostatic Pressure Test	AATCC 127 ICC ES (AC 212)*	ICC: 549 mm (21.6 in) water column for 5 hours	Passed
Surface Burning Characteristics	ASTM E 84	Flame Spread < 25 Smoke Developed < 450	Passed
<p>* (AC212 – Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing, also referred to as ASTM E 2570</p> <p>1. No cracking, checking, rusting, crazing, erosion, blistering, peeling, or delamination when viewed under 5x magnification</p> <p>2. Defined as a Class III vapor retarder per the 2009 IBC and IRC</p>			

b. Durability

TEST	TEST METHOD	CRITERIA	RESULTS
Abrasion Resistance	ASTM D 968	No deleterious effects after 500 liters (528 quarts)	No deleterious effects after 1000 liters (1056 quarts)
Accelerated Weathering	ASTM G 155 Cycle 1	No deleterious effects after 2000 hours	No deleterious effects after 5000 hours
	ASTM G 154 Cycle 1 (QUV)		No deleterious effects after 5000 hours
Freeze-Thaw	ASTM E 2485 (formerly EIMA 101.01)	No deleterious effects after 60 cycles	Passed – No deleterious effects after 90 cycles
	ASTM C 67 modified	No deleterious effects after 60 cycles	Passed – No deleterious effects after 60 cycles
	ASTM E 2485 /ICC-ES Proc. ICC ES (AC 235)***	No deleterious effects after 10 cycles	Passed – No deleterious effects after 10 cycles
Mildew Resistance	ASTM D 3273	No growth during 28 day exposure period	No growth during 60 day exposure period
Water Resistance	ASTM D 2247	No deleterious effects after 14 days exposure	No deleterious effects after 42 days exposure
Taber Abrasion	ASTM D 4060	N/A	Passed 1000 cycles
Salt Spray Resistance	ASTM B 117	No deleterious effects after 300 hours exposure	No deleterious effects after 1000 hours exposure
Water Penetration	ASTM E 331 ICC ES (AC 235)***	No water penetration beyond the inner-most plane of the wall after 15 minutes at 137 Pa (2.86 psf)	Passed 15 minutes at 137 Pa (2.86 psf)
Water Vapor Transmission	ASTM E 96 Procedure B	Vapor permeable	EPS 5 perm-inch Base Coat* 40 Perms Finish** 40 Perms
Drainage Efficiency	ASTM E 2273 ICC ES (AC 235)***	Minimum Drainage Efficiency of 90%	Passed
* Base Coat perm value based on Dryvit Genesis® ** Finish perm value based on Dryvit Quarzputz *** AC 235 (ASTM E 2568) – Acceptance Criteria for EIFS Clad Drainage Wall Assemblies			

c. Structural

TEST	TEST METHOD	CRITERIA	RESULTS
Tensile Bond	ASTM C 297/E 2134	Minimum 104 kPa (15 psi) - substrate or insulation failure	Minimum 213.6 kPa (31 psi)
Transverse Wind Load	ASTM E 330	Withstand positive and negative wind loads as specified by the building code	Minimum 4.3 kPa (90 psf)* 16 inch o.c. framing, ½ in sheathing screw attached at 203 mm (8 inch) o.c.
* All Dryvit components remain intact - for higher wind loads contact Dryvit Systems, Inc.			

d. Impact Resistance: In accordance with ASTM E 2486 (formerly EIMA Standard 101.86):

e. Fire performance

TEST	TEST METHOD	CRITERIA	RESULTS
Fire Resistance	ASTM E 119	No effect on the fire resistance of a rated wall assembly	Passed 1 hour
Ignitability	NFPA 268	No ignition at 12.5 kw/m ² at 20 minutes	Passed
Intermediate Multi-Story Fire Test	NFPA 285 (UBC 26-9)	<ol style="list-style-type: none"> 1. Resist flame propagation over the exterior surface 2. Resist vertical spread of flame within combustible core/component of panel from one story to the next 3. Resist vertical spread of flame over the interior surface from one story to the next 4. Resist lateral spread of flame from the compartment of fire origin to adjacent spaces 	Passed

2. The EIFS components shall be tested for:

a. Fire

TEST	TEST METHOD	CRITERIA	RESULTS
------	-------------	----------	---------

Surface Burning Characteristics	ASTM E 84	All components shall have a: Flame Spread \leq 25 Smoke Developed \leq 450	Passed
---------------------------------	-----------	--	--------

b. Durability

TEST	TEST METHOD	CRITERIA	RESULTS
Reinforcing Mesh Alkali Resistance of Reinforcing Mesh	ASTM E 2098 (formerly EIMA 105.01)	> 21dN/cm (120 pli) retained tensile strength after exposure	Passed
EPS (Physical Properties) Density	ASTM C 303, D 1622	15.2–20.0 kg/m ³ (0.95–1.25 lb/ft ³)	Pass
Thermal Resistance	ASTM C 177, C 518	4.0 @ 4.4 °C (40 °F) 3.6 @ 23.9 °C (75 °F)	Pass Pass
Water Absorption		2.5 % max. by volume	Pass
Oxygen Index	ASTM C 272	24% min. by volume	Pass
Compressive Strength	ASTM D 2863	69 kPa (10 psi) min.	Pass
Flexural Strength	ASTM D 1621 Proc.	172 kPa (25 psi) min.	Pass
Flame Spread	A	25 max.	Pass
Smoke Developed	ASTM C 203 ASTM E 84	450 max.	Pass

1.05 SUBMITTALS

- A. Product Data: The contractor shall submit to the owner/architect the manufacturer’s product data sheets describing products, which will be used on this project.
- B. Shop Drawings for Panelized Construction: The panel fabricator shall prepare and submit to the owner/architect complete drawings showing: wall layout, connections, details, expansion joints, and installation sequence.
- C. Samples: The contractor shall submit to the owner/architect two (2) samples of the EIFS System for each finish, texture and color to be used on the project. The same tools and techniques proposed for the actual installation shall be used. Samples shall be of sufficient size to accurately represent each color and texture being utilized on the project.
- D. Test Reports: When requested, the contractor shall submit to the owner/architect copies of selected test reports verifying the performance of the EIFS System.

1.06 QUALITY ASSURANCE

A. Qualifications

1. System Manufacturer: Basis of Design shall be Dryvit Systems, Inc. All materials shall be manufactured or sold by Dryvit and shall be purchased from Dryvit or its authorized distributors.
2. Sto and Master Wall are also approved manufacturers. Additional manufacturers may be approved as per Section 01.
3. Contractor: Shall be knowledgeable in the proper installation of the EIFS Systems and shall be experienced and competent in the installation of Exterior Insulation and Finish Systems. Additionally, the contractor shall possess a current EIFS System Trained Contractor Certificate* issued by the manufacturer
4. Insulation Board Manufacturer: ., shall be capable of producing the expanded polystyrene (EPS) in accordance with the current Manufacturer Specification for Insulation Board
5. Panel Fabricator: Shall be a contractor experienced and competent in the fabrication of architectural wall panels and shall possess a current EIFS System Trained Contractor Certificate* issued by the manufacturer.
6. Panel Erector: Shall be experienced and competent in the installation of architectural wall panel systems and shall be:
 - a. The panel fabricator or
 - b. An erector approved by the panel fabricator or
 - c. An erector under the direct supervision of the panel fabricator

B. Regulatory Requirements:

1. The EPS shall be separated from the interior of the building by a minimum 15-minute thermal barrier.
2. The use and maximum thickness of EPS shall be in accordance with the applicable building codes.

C. Certification

1. The EIFS System shall be recognized for the intended use by the applicable building code(s).

D. Mock-Up

1. The contractor shall, before the project commences, provide the owner/architect with a mock-up for approval.
2. The mock-up shall be of suitable size as required to accurately represent the products being installed, as well as each color and texture to be utilized on the project.

3. The mock-up shall be prepared with the same products, tools, equipment and techniques required for the actual applications. The finish used shall be from the same batch that is being used on the project.
4. The approved mock-up shall be available and maintained at the jobsite.
5. For panelized construction, the mock-up shall be available and maintained at the panel fabrication location.

1.07 DELIVERY, STORAGE AND HANDLING

- A. All materials shall be delivered to the job site in the original, unopened packages with labels intact.
- B. Upon arrival, materials shall be inspected for physical damage, freezing or overheating. Questionable materials shall not be used.
 1. Materials shall be stored at the jobsite in a cool, dry location, out of direct sunlight, protected from weather and other sources of damage.
- C. Protect all products from inclement weather and direct sunlight.

1.08 PROJECT CONDITIONS

A. Environmental Requirements

1. Application of wet materials shall not take place during inclement weather unless appropriate protection is provided. Protect materials from inclement weather until they are completely dry.
2. At the time of application, the minimum air and wall surface temperatures shall be as required by the Manufacturer:
3. These temperatures shall be maintained with adequate air ventilation and circulation for a minimum of
24 hours

- B. Existing Conditions: The contractor shall have access to electric power, clean water and a clean work area at the location where the EIFS materials are to be applied.

1.09 SEQUENCING AND SCHEDULING

- A. Installation of the EIFS System shall be coordinated with other construction trades.
- B. Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

1.10 WARRANTY

- A. Dryvit Systems, Inc. shall provide a written moisture drainage and limited materials warranty against defective material for a period of ten (10) years.
- B. The applicator shall warrant workmanship for a period of five (5) years.

1.11 DESIGN RESPONSIBILITY

- A. It is the responsibility of both the specifier and the purchaser to determine if a product is suitable for its intended use. The designer selected by the purchaser shall be responsible for all decisions pertaining to design, detail, structural capability, attachment details, shop drawings and the like. The EIFS Manufacturer has prepared guidelines in the form of specifications, installation details, and product sheets to facilitate the design process only.

1.11 MAINTENANCE

- A. Maintenance and repair shall follow the procedures noted in the EIFS System Application Instructions.
- B. All EIFS products should be designed to require minimal maintenance. However, as with all building products, depending on location, some cleaning may be required.
- C. Sealants and flashings shall be inspected on a regular basis and repairs made as necessary.

PART II PRODUCTS

2.01 MANUFACTURER

- A. All components of the EIFS System shall be supplied or obtained from the Manufacturer or its authorized distributors. Substitutions or additions of materials other than specified will void the warranty.

2.02 MATERIALS

- A. Portland Cement: Shall be Type I or II, meeting ASTM C 150, white or gray in color, fresh and free of lumps.
- B. Water: Shall be clean and free of foreign matter.

2.03 COMPONENTS – BASIS OF DESIGN SYSTEM IS DRYVIT OUTSULATION PLUS MD. BASF Senergy Senerflex Channeled Adhesive Design and StoTherm Essence Next are an approved equals.

A. Air/Water-Resistive Barrier Components

1. Dryvit Backstop® NT: A flexible, polymer-based, noncementitious water-resistive coating and air barrier available in Texture and Smooth.
2. Dryvit Grid Tape™: An open weave fiberglass mesh tape with pressure sensitive adhesive available in rolls
102 mm (4 in) wide by 91 m (100 yds) long.

B. Flashing Materials: Used to protect substrate edges at terminations.

1. Liquid Applied: An extremely flexible water-based polymer material, ready for use.
 - a. Shall be AquaFlash and AquaFlash Mesh
2. Sheet Type:
 - a. Shall be Flashing Tape and Surface Conditioner
 - 1) Dryvit Flashing Tape™: A high density, polyethylene film backed with a rubberized asphalt adhesive available in rolls 102 mm (4 in), 152 mm (6 in) and 229 mm (9 in) wide by 23 m (75 ft) long..
 - 2) Dryvit Flashing Tape Surface Conditioner™: A water-based surface conditioner and adhesion promoter for the Dryvit Flashing Tape.

C. Adhesives: Used to adhere the EPS to the air/water-resistive barrier, shall be compatible with the air/water-resistive barrier and the EPS.

1. Cementitious: A liquid polymer-based material, which is field mixed with Portland cement.
 - a. Shall be Primus or Genesis
2. Ready mixed: A dry blend cementitious, copolymer-based product, field mixed with water.
 - a. Shall be Primus® DM, Genesis® DM, Genesis® DMS, Rapidry DM 35-50 or Rapidry DM 50-75

D. Insulation Board: Expanded Polystyrene meeting Dryvit Specification for Insulation Board, DS131

1. Thickness of insulation board shall be minimum 1.5 inch.
2. The back side of the insulation board shall have 6.4 mm x 25 mm (1/4 in x 1 in) grooves running vertically and spaced 305 mm (12 in) on center (see Detail OMD 0.0.04).
3. The insulation board shall be manufactured by a board supplier listed by Dryvit Systems, Inc.

E. Insulation Board Closure Blocks: Expanded Polystyrene meeting Dryvit Specification for Insulation Board, DS131. The Closure Blocks shall measure a minimum of 152 mm (6 in) in height.

F. Dryvit Starter Strip

1. A 51 mm x 152 mm x 1.2 m (2 in x 6 in x 4 ft) piece of aged expanded polystyrene configured to receive the Dryvit Track™ and Vent Track™. It is required at the base of all walls, at base of horizontal terminations, and heads of windows and other openings.

G. Dryvit Vent Assembly:

1. A 51 mm x 152 mm x 305 mm (2 in x 6 in x 12 in) piece of aged expanded polystyrene, which is configured to contain a formed aggregate matrix material and receive the Dryvit Vent Track. It is required at the base of walls and the base of horizontal terminations and is capable of draining water.

H. Dryvit AP Adhesive™: A moisture cure urethane-based adhesive used to attach the Dryvit Track and Vent Track to the Backstop NT.

I. Dryvit Track:

1. A “J” shaped track complying with ASTM D 1784 and ASTM C 1063 located above the Dryvit Starter Strip.

J. Dryvit Vent Track:

1. A “J” shaped track complying with ASTM D 1784 and ASTM C 1063 containing a slot for drainage and located above the Dryvit Vent Assembly, along the base of walls and horizontal terminations.

K. Base Coat: Shall be compatible with the EPS insulation board and reinforcing mesh(es).

1. Cementitious: A liquid polymer-based material, which is field mixed with Portland cement.
 - a. Shall be Primus or Genesis
2. Noncementitious: A factory-mixed, fully formulated, water-based product.
 - a. Shall be NCB
3. Ready mixed: A dry blend cementitious, copolymer-based product, field mixed with water.
 - a. Shall be Primus DM, Genesis DM, Genesis DMS, Rapidry DM 35-50 or Rapidry DM 50-75.

L. Reinforcing Mesh: A balanced, open weave, glass fiber fabric treated for compatibility with other system materials.

1. Shall be Standard, Standard Plus, Intermediate, Panzer 15, Panzer 20, Detail and Corner Mesh
2. Shall be colored blue for product identification bearing the Dryvit logo.

M. Finish: Shall be the type, color and texture as selected by the architect/owner and shall be one or more of the following:

1. Standard DPR (Dirt Pickup Resistance): Water-based, acrylic finish with integral color and texture, and formulated with DPR chemistry:
 - a. Sandpebble® Fine DPR: Fine pebble texture.

2. E: Water-based, lightweight acrylic finish with integral color and texture, and formulated with DPR chemistry:
 - a. Sandpebble® Fine E

PART III EXECUTION

3.01 EXAMINATION

- A. Prior to installation of the EIFS System, the contractor shall verify that the substrate:
 1. Is of a type listed in Section 1.04.C.1.
 2. Is flat within 6.4 mm (1/4 in) in a 1.2 m (4 ft) radius.
 3. Is sound, dry, connections are tight; has no surface voids, projections, or other conditions that may interfere with the EIFS System installation or performance.
- B. Prior to installation of the EIFS System, the architect or general contractor shall insure that all needed flashings and other waterproofing details have been completed, if such completion is required prior to the EIFS application. Additionally, the contractor shall ensure that:
 1. Metal roof flashing has been installed in accordance with Asphalt Roofing Manufacturers Association (ARMA) Standards,
 2. Openings are flashed in accordance with the EIFS System Installation Details, DS167, or as otherwise necessary to prevent water penetration.
 3. Chimneys, Balconies and Decks have been properly flashed.
 4. Windows, Doors, etc. are installed and flashed per manufacturer's requirements and the EIFS System Installation Details, DS167.
- C. Prior to the installation of the EIFS System, the contractor shall notify the general contractor, and/or architect, and/or owner of all discrepancies.

3.02 PREPARATION

- A. The EIFS materials shall be protected by permanent or temporary means from inclement weather and other sources of damage prior to, during, and following application until completely dry.
- B. Protect adjoining work and property during EIFS installation.
- C. The substrate shall be prepared as to be free of foreign materials, such as oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellants, moisture, frost, and any other condition that may inhibit adhesion.

3.03 INSTALLATION

- A. The system shall be installed in accordance with the Dryvit EIFS System Application Instructions, DS169.
- B. The overall minimum base coat thickness shall be sufficient to fully embed the mesh. The recommended method is to apply the base coat in two (2) passes.
- C. High impact meshes shall be installed to 8'-0" above ground level at entire perimeter of EIFS work.

3.04 FIELD QUALITY CONTROL

- A. The contractor shall be responsible for the proper application of the EIFS materials.
- B. Dryvit assumes no responsibility for on-site inspections or application of its products.
- C. Contractor shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures, workmanship and as to the specific products used.
- D. The EPS supplier shall certify in writing that the EPS meets Dryvit's specifications.

3.05 CLEANING

- A. All excess EIFS System materials shall be removed from the job site by the contractor in accordance with contract provisions and as required by applicable law.
- B. All surrounding areas, where the Dryvit EIFS System has been applied, shall be left free of debris and foreign substances resulting from the contractor's work.

3.06 PROTECTION

- A. The EIFS System shall be protected from inclement weather and other sources of damage until dry and permanent protection in the form of flashings, sealants, etc. are installed.

END OF SECTION

SECTION 07-2715 – FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE.

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fluid-applied, vapor-permeable membrane air barriers.

1.2 RELATED REQUIREMENTS

1. Section 04-2000 "Unit Masonry" for compatibility with flashing components.
2. Section 06-1600 "Sheathing" for air barrier substrates and joint treatments.
3. Division 07 roofing Sections for roof assembly air barriers and interface coordination.
4. Division 08 exterior openings sections for framing for aluminum-framed entrances and storefronts, translucent panels, louvers and vents receiving air barrier transition assembly specified in this Section.

1.3 REFERENCES

- A. References, General: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.
- B. Air Barrier Association of America (ABAA): www.airbarrier.org:
1. ABAA Quality Assurance Program
- C. ASTM International (ASTM): www.astm.org:
1. ASTM A 240/A 240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
 3. ASTM C 1193 - Guide for Use of Joint Sealants
 4. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
 5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
 6. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials
 7. ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
 8. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors
 9. ASTM E 1186 - Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
 10. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials
 11. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- D. National Fire Protection Association (NFPA): www.nfpa.org:
1. NFPA 285 - Standard Fire Test Method For Evaluation Of Fire Propagation Characteristics Of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
- E. U. S. Environmental Protection Agency (EPA): www.epa.gov:

1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings
 - F. US Green Building Council (USGBC): www.usgbc.org:
 1. Leadership in Energy and Environmental Design (LEED) Green Building Rating System
- 1.4 ADMINISTRATIVE REQUIREMENTS
- A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.
 - B. Preinstallation Conference: Conduct conference at Project Site.
 1. Review requirements for air barrier products and installation, project and manufacturer's details, mockups, testing and inspection requirements, and coordination and sequencing of air barrier work with work of other Sections.
 2. Review manufacturer's instructions for air barrier application meeting Project requirements for substrates specified, including three-dimensional video model demonstrating proper application of components at wall openings.
- 1.5 ACTION SUBMITTALS
- A. Product Data: For each type of air barrier product specified, including:
 1. Technical data indicating compliance with requirements.
 2. Substrate preparation instructions and recommendations.
 - B. Shop Drawings: Show locations for air barrier. Show details for each type of substrate, joints, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.
 1. Show location of transition and accessory materials providing connectivity through out the assemblies.
- 1.6 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer, manufacturer and Air Barrier Inspector.
 1. Certification of manufacturer's approval of Installer.
 2. Certification of ABAA accreditation of Installer firm and list of Installer's ABAA-certified installers and supervisors on Project.
 - B. Manufacturer's Product Compatibility Certificate: Certify compatibility of air barrier products with adjacent materials.
 - C. Low-Emitting Product Certificate: For air barrier products specified to meet volatile organic emissions standards, submit Greenguard Children and Schools Certification or comparable certification acceptable to Architect.
 - D. Fire Propagation Characteristics Certificate: From a qualified testing agency, documentation that air barrier system as a component of a wall assembly has been tested and passed NFPA 285. Include system classification number of testing agency on shop drawings.

- E. Product Test Reports: Test data for air barrier products and air barrier assembly, by qualified testing agency, indicating proposed membrane air barrier meets performance requirements, when requested by Architect.
- F. Warranty: Sample of unexecuted manufacturer and installer special warranties.
- G. Field quality control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm with minimum three years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years experience installing similar work, able to communicate verbally with Contractor, Architect and employees.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum five years experience in manufacture of air barrier membrane as one of its principal products.
 - 1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
 - 2. Manufacturer is accredited by the Air Barrier Association of America.
 - 3. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Completed and signed Substitution Request form.
 - b. Product data, including certified independent test data indicating compliance with requirements.
 - c. Sample shop drawings from similar project.
 - d. Project references: Minimum of five installations of similar system not less than five years old, with Owner and Architect contact information.
 - e. Certificate of ABAA accreditation if required for Project.
 - f. Sample warranty.
- C. Air Barrier Inspector Qualifications: A technical representative not engaged in the sale of products and experienced in the installation and maintenance of the specified air barrier system, qualified to perform 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 Inspector shall be one of the following:
 - 1. A independent party certified as an air barrier inspector by the ABAA or other certifying organization acceptable to Architect, retained by the Owner.
- D. Mockups: Provide air barrier mockup application within mockups required in other sections, or if not specified, in an area of not less than **150 sq. ft.** of wall surface where directed by Architect for each type of backup wall construction. Include examples of surface preparation, crack and joint treatment, air barrier application, and flashing, transition, and termination conditions, to set quality standards for execution.

1. Include intersection of wall air barrier with roof air barrier and with foundation wall intersection.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Accept materials on site in manufacturer's unopened original packaging.
- B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by air barrier manufacturer.
- C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section "Construction Waste Management"

1.9 ENVIRONMENTAL REQUIREMENTS

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

1.10 SCHEDULING

- A. Coordinate installation of membrane air barrier with completion of roofing and other work requiring interface with air barrier.
- B. Schedule work so air barrier applications may be inspected prior to concealment.
- C. Ensure air barrier materials are cured before covering with other materials.

1.11 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which air barrier manufacturer agrees to furnish and install air barrier material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.
 1. Access for Repair: Owner shall provide unimpeded access to the Project and the air barrier system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding materials upon completion of repair.
 2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
 3. Warranty Period: 10 years date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of air barrier materials from the following:
 1. Movement of the structure caused by structural settlement or stresses on the air barrier exceeding manufacturer's written specifications for elongation.
 2. Mechanical damage caused by outside agents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: Provide air barrier products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com,
- B. Substitutions: as per Section 01-2500

2.2 MATERIALS, GENERAL

- A. Source Limitations: Obtain air-barrier materials from single source from single manufacturer.
- B. VOC Content: 250 g/L maximum per 40 CFR 59, Subpart D (EPA Method 24) and complying with requirements of authorities having jurisdiction.
- C. Compatibility: Provide membrane air barrier materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by membrane air barrier manufacturer based on testing and field experience.

2.3 PERFORMANCE REQUIREMENTS

- A. General: Membrane air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.
- B. Air-Barrier Assembly Air Leakage: Maximum **0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa)**, when tested according to ASTM E 2357.
- C. Fire Propagation Characteristics: Provide air barrier system qualified as a component of a comparable wall assembly that has been tested and passed NFPA 285.

2.4 MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, UV-resistant, synthetic membrane, formulated for application in a range of 48 - **70 mils (wet)**, 25 - **35 mils (dry)**
 - 1. Basis of Design Product: Tremco, Inc., ExoAir 230.
 - 2. **Approved Alternate Product: W.R. Meadows Air Shield LMP**
 - 3. Air Permeance, ASTM E 2178: **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, maximum.
 - 4. Vapor Permeance, ASTM E 96/E96M: Minimum **12 perms (690 ng/Pa x s x sq. m)**.
 - 5. Elongation, Ultimate, ASTM D 412, Die C: 600 percent, minimum.
 - 6. Combustion Characteristics: Class A, flame spread, not greater than 25; smoke developed, not greater than 450, per ASTM E 84.
 - 7. UV Resistance, QUV-B: Over 160 cycles of UV and water spray with no observable deterioration.
 - 8. VOC Content: Less than 50 g/L.

2.5 ACCESSORY MATERIALS

- A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete air barrier assembly meeting performance requirements, and compatible with air barrier membrane material and adjacent materials.
- B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air barrier manufacturer, when installing modified bituminous self-adhered membranes.
 - 1. Basis of Design Product: Tremco, Inc., ExoAir Primer
- C. Transitions:
 - 1. Counterflashing Strip: Modified bituminous, **40 mils (1.0 mm)** thick self-adhering composite sheet consisting of **32 mils (0.8 mm)** of SBS rubberized asphalt laminated to an **8 mils (0.2 mm)** high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate transitions and for termination of air barrier to bituminous roof membranes and to air barrier terminations at openings.
 - a. Basis of Design Product: Tremco, Inc., ExoAir TWF Thru-Wall Flashing.
 - 2. High Temperature Flashing Strip and Underlayment: Butyl, **24 mil** thick self-adhering composite sheet consisting of **20 mils** of butyl laminated to **4 mil** polyethylene film; thermally stable under intermittent, non-continuous exposure up to **240 deg F (115 deg C)**.
 - a. Basis of Design Product: Tremco, Inc., ExoAir 111.
 - 3. Foil Flashing Strip: Butyl, **24 mil** thick self-adhering composite sheet consisting of **20 mils** of butyl laminated to **4 mil** polyethylene film; thermally stable under intermittent, non-continuous exposure up to **240 deg F (115 deg C)**.
 - a. Basis of Design Product: Tremco, Inc., ExoAir 111.
 - 4. Butyl Strip: Butyl, **24 mil** thick self-adhering composite sheet consisting of **20 mils** of butyl laminated to **4 mil** polyethylene film; thermally stable under intermittent, non-continuous exposure up to **240 deg F (115 deg C)**, for termination of air barrier to EPDM or TPO roof membranes.
 - a. Basis of Design Product: Tremco, Inc., ExoAir 111
 - 5. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, **0.0187 inch (0.5 mm)** thick, and Series 300 stainless-steel fasteners.
 - 6. Opening Transition Assembly: Cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, with aluminum race for insertion into aluminum framing extrusions, with the following characteristics:
 - a. Basis of Design Product: Tremco, Inc., Proglaze ETA Engineered Transition Assembly. Tear Strength: 110 lb/in (19.3 kN/m)
 - 7. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with manufacturer's recommended silicone sealant for bonding extrusions to substrates.
 - a. Basis of Design Product: Tremco, Inc.; Spectrem SimpleSeal.
- D. Reinforcing Fabric: High strength mesh fabric consisting of open-weave glass fiber saturated with synthetic resins formulated for high moisture resistance, for reinforcing of liquid applications; not less than **2.5 oz/sq. yd (85 g/sq. m)**.

1. Basis of Design Product: Tremco, Inc., Tremco 2011.
- E. Liquid Joint Sealants:
1. ASTM C 920, single-component polyurethane, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories.
 - a. Basis of Design Product: Tremco, Inc., Dymonic 100.
 2. ASTM C 920, single-component, neutral-curing silicone, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories post installation of the membrane.
 - a. Basis of Design Product: Tremco, Inc., Spectrem 1.
- F. Sprayed Polyurethane Foam Sealant: Sprayed Polyurethane Foam Sealant: Foamed-in-place, **1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m)** density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.
1. Basis of Design; Tremco Inc., Flexible Low Expanding Foam (LEF)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Surface Condition: Before applying air barrier materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.
1. Verify concrete and masonry surfaces are visibly dry, have cured for time period recommended by membrane air barrier manufacturer, and are free from release agents, curing agents, and other contaminants.
 2. Test for capillary moisture by method recommended in writing by air barrier manufacturer..
 3. Verify masonry joints are filled with mortar and struck flush.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INTERFACE WITH OTHER WORK

- A. Commencement of Work: Commence work once air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.
- B. Sequencing of Work: Coordinate sequencing of air barrier work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air barrier system installation. Coordinate installation of EXOAIR® 230 with the roofing trade to ensure compatibility and continuity with the roofing system.
- C. Subsequent Work: Coordinate air barrier work with work of other sections installed subsequent to air barrier to ensure complete inspection of installed air barrier and sealing of air barrier penetrations necessitated by subsequent work.

3.3 PREPARATION

- A. Clean, prepare, and treat substrate in accordance with air barrier manufacturer's written instructions.
 - 1. Mask adjacent finished surfaces.
 - 2. Remove contaminants and film-forming coatings from substrates.
 - 3. Remove projections and excess materials and fill voids with substrate patching material.
 - 4. Prepare and treat joints and cracks in substrate per ASTM C 1193 and membrane air barrier manufacturer's written instructions.

3.4 APPLICATION OF ACCESSORY MATERIALS

- A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions. Install transition materials and other accessories to form connect and seal membrane air barrier material to adjacent components of building air barrier system, including, but not limited to, roofing system air barrier, exterior fenestration systems, door framing, and other openings.
- B. Primer: Apply primer to substrates when recommended by air barrier manufacturer at required rate for those substrates that will be receiving a modified bituminous self-adhered membrane. Reprime areas not covered within 24 hours.
- C. Assembly Transitions: 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.
 - 1. Opening Transitions: Fill gaps at perimeter of openings with foam sealant and apply approved transition or accessory material
 - 2. Penetrations: Fill gaps at perimeter of penetrations with foam sealant and level with approved sealant. or seal transition strips around penetrating objects and terminate with approved sealant.
 - 3. Joints: Bridge and cover isolation joints, expansion joints, and discontinuous joints between separate assemblies utilizing approved transition or accessory materials.
 - 4. Changes in Plane: Apply approved sealant beads at corners and edges to form smooth transition.
 - 5. Substrate Gaps: Cover gaps with stainless steel sheet mechanically attached to substrate and providing continuous support for air barrier.
- D. Flashings: Seal top of through-wall flashings to membrane air barrier with a continuous bead of approved sealant recommended by air barrier manufacturer.
- E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

- A. General: Apply fluid air-barrier material to form a seal with transition materials and accessories to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.
- B. Membrane Air Barrier: Apply fluid air barrier material in full contact with substrate to produce a continuous seal according to membrane air barrier manufacturers written instructions.

1. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, **-in a range of 25 – 35 mils (1.0-mm)** dry film thickness depending on substrate, applied in one or more equal coats, roller- or spray- applied.
- C. Connect and seal exterior wall air-barrier membrane continuously to subsequently-installed 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, wall openings, and other construction used in exterior wall openings, using approved transitions and accessory materials.
- D. Wall Openings: Apply approved sealant to adhere silicone extrusion to perimeter of windows, curtain walls, storefronts, doors, and louvers. Apply [opening transition assembly] [preformed silicone sealant extrusion] according to air barrier transition manufacturer’s written instructions.
- E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer’s recommendations and extend repair beyond repaired areas to maintain continuity.
- F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
 1. Scope of Testing: Testing shall include the following:
 - a. Qualitative air-leakage testing per ASTM E 1186.
 - b. Quantitative air-leakage testing per ASTM E 783.
 - c. Photo documentation of work to be subsequently concealed.
- B. ABAA Audit: Provide Installer audit by ABAA. Coordinate scheduling of work and associated audit inspections. Arrange and pay for site inspections by ABAA to verify conformance with the manufacturer’s instructions, ABAA QAP, and requirements of this Section.
- C. Coordination of Testing: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
 1. Do not cover Work until testing and inspection is completed and accepted.
- D. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
- E. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.7 CLEANING AND PROTECTING

- A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
- B. Protect membrane air barrier from damage from subsequent work. Protect membrane materials from exposure to UV light for period in excess of that acceptable to membrane air barrier manufacturer; replace overexposed materials and retest.

END OF SECTION

SECTION 07-4113 – STANDING SEAM METAL ROOF

GENERAL

1.1 SECTION INCLUDES

- A. Structural metal roof panels.
- B. Gutters, underlayments, sealant for metal roofs, snow retention systems.

1.2 RELATED SECTIONS

- A. Section 06-1000 – Rough Carpentry.

1.3 REFERENCES

- A. American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural Members (2008).
- B. American Institute of Steel Construction (AISC) Manual of Steel Construction (Current Edition).
- C. ASTM International (ASTM):
 - 1. ASTM A792 – Specification for Sheet Steel, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 2. ASTM E283 – Test Method for Rate of Air Leakage over Solid Substrate.
 - 3. ASTM E331 – Test Method for Rate of Water Penetration over Solid Substrate.
 - 4. ASTM E1680 – Test Method for Rate of Air Leakage over Open Framed Structure.
 - 5. ASTM E1646 – Test Method for Rate of Water Penetration over Open Framed Structure.
 - 6. ASTM E1592 – Standard Test Method for Structural Performance of Sheet Metal and Siding Systems by Uniform Static Air Pressure Difference.
 - 7. ASTM E 2140: Water Penetration – Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
 - 8. ASTM E 1996/E 1886 – Large Missile Impact Test.
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - 1. Architectural Sheet Metal Manual.
- E. Underwriters Laboratory (UL) Roofing Materials and Systems Directory:
 - 1. Roofing Materials and Systems Directory listings and classifications of Underwriter's Laboratory roofing construction assemblies.

1.4 SYSTEM DESCRIPTION:

- A. The extent of each type of preformed metal roofing panel as indicated on the drawings shall include preformed metal roof panels, flashing required to weatherproof the system (ridge, hip, valley, cleat, eave, rake wall, rake edge, apron, inside corner, outside corner, gutter, downspout, drip sill, end wall, and other miscellaneous flashing), related accessories including but not limited to; underlayment, butyl tape, sealants used in conjunction with the roofing system, and necessary attachment hardware as required to meet the performance standards and complete the roofing system.
- B. Design Requirements:
 - 1. Continuous, one-piece, preformed, prefinished single length roof panels.
 - 2. Panels, clips, and other components required for specific project conditions.
 - 3. Manufacturer is responsible for providing evidence acceptable to Architect that manufacturer's specified roof system is capable of meeting thermal, wind uplift, and performance requirements specified.
- C. Thermal Movement:
 - 1. Complete metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - 2. Interface between panel and expansion clip shall provide for applicable thermal movement in each direction along longitudinal direction.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01-3300 – Administrative Requirements.
- B. Shop Drawings Submittals:
 - 1. Manufacturer of the metal roof system shall provide complete shop drawings.
 - 2. Shop drawings shall be submitted and returned as approved/approved as noted prior to the beginning of product production.
- C. Product Data Submittals:
 - 1. Submit manufacturer's detailed product literature including the system profile sheet, system description including: material base-sheet gauge, seam height, panel on-center, finish, and sealant as required.
 - 2. Submit manufacturer's installation guidelines of the specified product.
- D. Submit a sample of each type of roof panel profile and a color sample. In the case where custom color is specified, submit a custom color chip for written approval and a standard color product sample for finish system review.

1. Color Selection Samples: For each finish product specified, supply manufacturer's standard color chart with a minimum of 32 standard colors.
2. Product Samples: For each product specified, provide a full width sample, associated clip (if required) and actual color chip of selected color.

1.6 QUALITY ASSURANCE

A. Qualification of the Product Manufacturer:

1. Manufacturer shall be a company specializing in Architectural Sheet Metal Products with at least twenty (20) years experience. Listing as a prequalified manufacturer does not release manufacturer from providing complete, current and acceptable test data for each performance, thermal, and wind load requirement specified for specific profile proposed.
2. Manufacturer shall operate a permanent, full-time, manufacturing facility where the metal roof panels are produced on fixed based multi-station roll forming machines that are included in the Underwriter's Laboratory field inspection services. These facilities shall be currently under inspection at least four times per year by Underwriter's Laboratory personnel to verify compliance with UL certification. Portable on-site roll formers may not be used unless roof panels exceed 90 feet (27.5 m) in length.

B. Qualification of Installers:

1. Competent and skilled sheet metal applicators familiar with the products, standard details and recommendations. Applicator shall have at least two year experience applying these types of materials with successful completion of projects with similar scope. Applicator shall be a manufacturer approved installer with company issued documentation for review.
2. Installers shall be thoroughly trained and experienced in the necessary crafts and completely familiar with and comply with the recommendations and details of the manufacturer and the "Architectural Sheet Metal Manual" published by SMACNA.
3. Installers shall follow the manufacturers' installation details without exception unless written authorization from the manufacturer and architect are provided on an installation detail revision. Detail revision authorization shall be made in advance of product installation.

C. Mock-Up:

1. The first 20 panels installed shall serve as a mock-up for A/E's approval of appearance. The sample area, when approved by A/E and Owner, shall become the project standard for appearance

1.7 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roof system components to project site in manufacturer's unopened original containers.
- B. Protect roof system components during shipment, storage, handling and erection from mechanical abuse, stains, discoloration and corrosion.
- C. Provide strippable plastic film on all painted surfaces between contact areas to prevent abrasion during shipping, storage and handling.
- D. Store materials off the ground, providing for drainage, under protective cover which allows for air circulation and protection from foreign material contamination, mechanical damage, cement, lime, or other corrosive materials
- E. Handle materials to prevent damage to surfaces, edges and ends of roofing components. Damaged material shall be rejected and removed from site.
- F. Examine materials upon delivery to jobsite. Reject and remove physically damaged, stained or marred material from project site.
- G. Metal roof components with strippable film shall not be stored with exposure to direct sunlight.
- H. Stack material to prevent damage and allow for adequate ventilation and drainage.

1.9 PROJECT CONDITIONS

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for preformed metal roofing system.
- B. Protection:
 - 1. Provide protection or avoid traffic on completed roof surfaces.
 - 2. Do not overload roof with stored materials.
 - 3. Support no roof-mounted equipment directly on roofing system.

1.10 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. Determine Work of other trades that penetrates the roof is coordinated by location, in place, and accepted prior to installation of roofing system.

1.11 WARRANTY

- A. Furnish manufacturer's Non-prorated Twenty Year Finish Warranty stating that the architectural fluorocarbon coating will:
 - 1. Not crack, chip, peel or exhibit any other mechanical failure of paint to adhere to the substrate.
 - 2. Not exhibit fading or color change in excess of five hunter delta E units as determined by ASTM D2244-79.
 - 3. Not chalk in excess of a numerical rating of eight as determined by ASTM D4214-98.
- B. Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roof panel assemblies that fail in materials or workmanship within specified warranty period:
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or penetrating.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: 20 years, 6 months from Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Dimensional Metals Inc., which is located at: 58 Klema Dr. N.; Reynoldsburg, OH 43068; Toll Free Tel: 800-828-1510; Tel: 740-927-3633; Fax: 740-927-3319; Email: info@dmimetals.com; Web: www.dmimetals.com
- B. **MBCI LokSeam, Everlast Metal SSL-175 and Metal Sales Vertical Seam are approved equal**
- C. Requests for substitutions will be considered in accordance with provisions of Section 01-2500.

2.2 SHEET MATERIALS – GENERAL

- A. Prefinished base sheet material shall be Galvalume Aluminum-Zinc (AZ50) Alloy Coated Steel Grade C meeting ASTM A792.
- B. Finish shall be 70% PVDF fluorocarbon coating, applied on a continuous coil coating line, with top side dry film thickness of 1.1 +/- .01 mil dry film thickness and on the reverse side a wash coat and primer of .04 +/- .01 mil total dry film thickness.
 - 1. Galvalume DynaClad: Consists of aluminum-zinc alloy coated (55% aluminum, 43.4% zinc, 1.6% silicon, nominal percentage by weight) carbon steel of commercial weight meeting ASTM 792.
 - 2. HDG90 DynaClad: Consists of hot-dipped galvanized steel base sheet of

commercial weight (AISI G90 designation) meeting ASTM A653.

3. Aluminum DynaClad: Consists of 3105 H14 alloy aluminum base sheet of commercial weight meeting ASTM B209.
- C. Finish color shall be selected by the Architect from the manufacturer's standard colors and metallic finishes. Unless otherwise noted all products shall be of the same finish and color.
- D. Strippable film shall be applied to the topside of the painted coil to protect the finish during fabrication, shipping and field handling. This strippable film shall be removed during installation.

2.3 METAL ROOFING SYSTEMS – GENERAL

- A. Standing seams shall incorporate a continuous engineered interlocking connection with concealed anchor clips
- B. Standing seams shall contain factory injected non-curing sealant that runs continuously throughout the panel length as job conditions dictate.
- C. Panel clips shall be as recommended by the manufacturer to meet the performance criteria of this specification.
- D. All exposed adjacent flashing shall be of the same material and finish as the roof panels.
- E. Fasteners:
 1. Exposed screw fasteners shall be 300 series alloy stainless steel with integrally bonded neoprene washers or Zinc Aluminum Cast head covers with integral neoprene gaskets. Exposed fasteners shall be pre-painted to match roof.
 2. Exposed pop rivets shall be stainless steel, rivet and mandrel, type #44 – 1/8 inch (3 mm) diameter 1/4 inch (6 mm) grip range minimum. Exposed pop rivets shall be pre-painted to match the metal roof system.
 3. Concealed fasteners for anchor clips shall be # 14-13 pancake head #2 square drive as required to meet the performance criteria in this specification.
 4. Concealed fasteners for flashing attachment shall be # 10-13 by 1 inch (25 mm) or #10-16 by 1 inch (25 mm) long truss head #2 square drive screw.
 5. There shall be no exposed fasteners except to fasten flashing at fixing points, or for panel attachment as dictated by warranty requirements for longitudinal thermal expansion and contraction, or as indicated on the shop drawings.

2.4 METAL ROOFING SYSTEMS – FABRICATION

- A. Panels shall be fabricated on fixed base machines located within a permanent

fabrication facility in continuous lengths as required. No horizontal end lap joints will be accepted, unless panels exceed 90 feet (27.5 m) in length or jobsite conditions dictate.

- B. Panel design shall incorporate concealed clips and fasteners. Exposed fasteners in roofing panels will not be accepted unless indicated on shop drawings.
- C. Standing seam design shall prevent water infiltration by utilizing a capillary break or continuous non-curing sealant to prevent siphoning.
- D. Fabricate roofing and related sheet metal work in accordance with approved shop drawings and applicable standards set forth in the Sheet Metal and Air Conditioning Contractors National Association – Architectural Sheet Metal Manual (seventh edition, 2012)
- E. Roofing and sheet metal flashing shall be fabricated in minimum 10 feet (3048 mm) lengths except as noted otherwise. Flashing shall have a minimum 3/4 inch (19 mm) hemmed edges in exposed locations. Provide field fabricated miters for components that change direction on the project.
- F. Gutters shall be in continuous lengths up to 50 feet (15.25 m). Expansion joints shall be provided to avoid lapped gutter joints.

2.5 STRUCTURAL METAL ROOF PANELS

- A. Product: INTER-LOCK IL20 as manufactured by Dimensional Metals Inc.
 - 1. Performance Testing:
 - a. UL-90 580 class 90 rated assembly.
 - b. ASTM E 1592: Static Air Pressure Difference.
 - c. ASTM E 283: Air Leakage Test.
 - d. ASTM E 331: Water Penetration.
 - 2. Seam Height: 1-3/4 inches (44 mm).
 - 3. Seam On-Center: (Model IL2018) 18 inches (457 mm).
 - 4. Panel Profile: Striated (standard).
 - 5. Material/Finish: 24 Gauge Galvalume with DynaClad PVDF finish.
 - 6. Color: As selected from manufacturer's standard material/finish colors.

2.6 UNDERLAYMENTS

- A. Product: DynaClad Premium Roofing Underlayment as supplied by Dimensional Metals Inc. or approved equal.
 - 1. Fabric Specifications:
 - a. Weave: Woven white PP scrim (UV stabilized).
 - b. Coating: 1.5 mil/1.2 mil average (35/28 g/m2/side).

- c. Color: Gray.
- d. Weight: 4.30 oz/yd² (146g/m²) +/- 5 %.
- e. Thickness: 10 mil (0.25mm) ASTM D5199.
- 2. Performance:
 - a. Grab Tensile: Warp 133 lb (592 N): Weft 114 lb (507 N): ASTM D5034.
 - b. Strip Tensile (N/5cm): Warp 94 lb/in (823): Weft 82 lb/in (718): ASTM D5035.
 - c. Tensile Elongation: Warp 20%: Weft 20%: ASTM D5035.
 - d. Tongue Tear: Warp 54 lb (240 N): Weft 46 lb (205 N): ASTM D2261.
 - e. Trapezoidal Tear: Warp 52 lb (231 N): Weft 43 lb (191 N): ASTM D4533.
 - f. Mullen Burst: 200 psi (1378 kPa): ASTM D376.
 - g. Moisture Vapor Transmission: less than 0.1 perms: ASTM E96.
 - h. UV Weathering: UV stabilizer added to coating for improved UV resistance, greater than 6 months exposure.
 - i. Coefficient of Friction: Warp 1.25: Weft 1.18 (DRY RUBBER). Warp 1.56: Weft 1.53 (WET RUBBER): CAN/CGSB-75.1-M88.
 - j. Class A Fire Resistance Rating: ASTM E 108 (2004), UL790 (1997), UBC 15-2 (1997).
 - k. Florida Building Code: ICC-ES, AC 188 "Acceptance Criteria for Roof Underlayments".
 - l. Miami-Dade County Product Control Approved NOA 07-0307.09 ep. May 24, 2012: Meets the requirements of CAN/CSA A220.1.

2.7 SEALANT FOR METAL ROOFS

- A. Product: Novaflex Metal Roof Sealant as supplied by Dimensional Metals Inc.
 - 1. Meets or exceeds ASTM C-920, TT-S-001543A and TT-S-230C.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine alignment and placement of building roof structure before proceeding with installation of preformed metal roofing.
- B. Examine metal roof deck before starting installation. Deck shall be clear, clean and smooth, free of depressions, waves, or projections, dry and shall remain dry and free of ice and snow, after roofing application commences. Deck flutes shall be clean and dry.
- C. Field check dimensions and check support alignment with taut string or wire. Support misalignment may cause additional stresses in the panels and contribute to oil canning.

- D. Do not proceed with installation until conditions are satisfactory. Notify the architect in writing of unsatisfactory conditions.
- E. Underlayment Installation:
 - 1. Verify that underlayment has been installed over solid substrate.
 - 2. Ensure underlayment is installed horizontally, starting at the eave working to the ridge with a 6 inches (152 mm) minimum overlap.
 - 3. Ensure that all fasteners are totally flush with the substrate.

3.2 INSTALLATION

- A. General Requirements:
 - 1. Install roofing and flashing in accordance with approved shop drawings and manufacturer's product data, within specified tolerances.
 - 2. Isolate dissimilar metals, masonry and concrete from metal roof system with bituminous coating.
 - 3. Anchorage shall allow for thermal expansion and contraction without stress or elongation of panels, clips or anchors.
 - 4. Coordinate flashing and sheet metal work to provide watertight conditions at roof terminations. Fabricate and install in accordance with standards set forth in the SMACNA Manual using continuous cleats at all exposed edges.
- B. Underlayment:
 - 1. Install proper protection to finished substrate to prevent moisture infiltration to roofing assembly prior to placement of panels. Cover complete roof area to receive metal roof panels with underlayment.
- C. Preformed Metal Panels:
 - 1. Fasten anchor clips with fasteners as recommended by the manufacturer as required to meet the performance criteria specified.
 - 2. Install starter and edge trim before installing roof panels.
 - 3. Remove strippable plastic film prior to installation of roof panels.
 - 4. Erect metal roofing with lines, planes, rises and angles sharp and true, and plane surfaces free from objectionable warp, dents, buckle or other physical defects.
 - 5. Do not allow traffic on completed roof.
 - 6. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
 - 7. Remove and replace any panels or flashing components that are damaged beyond successful repair.
- D. Flashing:
 - 1. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations

for installation work where the manufacturer's approved shop drawings do not define a specific detail.

2. Conceal fasteners and expansion provisions wherever possible.
3. Hem all exposed edges of sheet metal flashing that are exposed with at least 3/4 inch (19 mm) fold under.
4. Insert metal flashing into reglets, anchor with wedges and seal all joints.
5. Set sheet metal items level, true to line and plumb.
6. Secure all metal flashing to wood nailers with screws as indicated on the approved shop drawings.
7. Use cleats to keep flashing end laps closed when face width exceeds 8 inches (203 mm).

3.3 FIELD QUALITY CONTROL

A. Tolerances:

1. Applicable erection tolerances: Maximum variation from true planes or lies shall be 1/4 inch (6 mm) in 20 feet (6.1 m) or 3/8 inch (9.5 mm) in 40 feet (12.2 m).
2. Metal roof systems cannot correct any previously installed support or wood nailer problems that do not meet the above tolerances.

B. Manufacturer's Field Service:

1. Manufacturer's representative shall inspect all Watertight Warranted projects during the installation of the metal roof system.
2. Inspections shall be scheduled as required by the manufacturer of the roofing system.
3. Two mandatory visits are required:
 - a. Inspection of proper panel and flashing installation.
 - b. Final inspection upon completion of the metal roof installation.
4. Upon final inspection a report will be issued to the installer of any discrepancies and requirements for additional work. If additional work required the manufacturer will provide another final inspection to verify acceptance of completed work.

3.4 CLEANING

- A. Clean exposed surfaces of work promptly after completion of installation. To prevent rust from staining the painted finish, immediately remove filings produced by drilling or cutting.
- B. Clean roof in accordance with manufacturer's recommendations.
- C. Touch up minor abrasions and scratches in finish with the manufacturer's supplied PVDF touch up paint.

- D. Remove all scrap and construction debris from the site.

3.5 PROTECTION

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

END OF SECTION

SECTION 07-7100 - 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 specialties.
- 2. Roof-edge drainage systems.
- 3. Reglets and counterflashings.

- B. Related Requirements:

- 1. Section 05-5000 "Metal Fabrications" for downspout guards and downspout boots.
- 2. Section 06-1053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
- 3. Section 07-4113 "Standing-Seam Metal Roof Panels" for roof-edge drainage-system components provided by metal-roof-panel manufacturer.
- 4. Section 07-7252 "Snow Guards" for manufactured snow guard devices.
- 5. Section 07-9200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

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

- 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support 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.

1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Samples for Verification:

- 1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

2. Include roof-edge specialties roof-edge drainage systems reglets and counterflashings made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section .

1.7 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-specialty installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 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 specialties 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 , ambient; 180 deg F , material surfaces.

2.2 ROOF-EDGE SPECIALTIES

- A. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous metal receiver with integral drip-edge cleat to engage fascia cover . Provide matching corner units.
1. Formed Aluminum Sheet Fascia Covers: Aluminum sheet, 0.040 inch thick .
 - a. Surface: Smooth, flat finish.
 - b. Finish: Two-coat fluoropolymer .
 - c. Color: White .
 2. Corners: Factory mitered and soldered .
 3. Splice Plates: Concealed , of same material, finish, and shape as fascia cover.
 4. Receiver: Aluminum sheet, 0.050 inch thick .
 5. Special Fabrications: .
 6. Fascia Accessories: .

2.3 ROOF-EDGE DRAINAGE SYSTEMS

- A. Gutters: Manufactured in uniform section lengths not exceeding 12 feet , with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
1. Aluminum Sheet: 0.040 inch thick.
 2. Gutter Profile: Style K according to SMACNA's "Architectural Sheet Metal Manual."
 3. Embossed Surface: Embossed with design as indicated by manufacturer's designations .
 4. Corners: Factory mitered and soldered .
 5. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
- B. Downspouts: Corrugated rectangular complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum: 0.040 inch thick.
- C. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout , exterior flange trim, .
1. Formed Aluminum: 0.032 inch thick.
- D. Zinc-Coated Steel Finish: Two-coat fluoropolymer .
1. Color: White .

- E. Aluminum Finish: Two-coat fluoropolymer .
 - 1. Color: White .

2.4 REGLETS AND COUNTERFLASHINGS

- A. 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 thick.
 - 2. Corners: Factory mitered and soldered .
 - 3. Stucco Type, Embedded: Provide reglets with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
- B. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet 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 thick.
- C. Zinc-Coated Steel Finish: Two-coat fluoropolymer .
 - 1. Color: White .
- D. Aluminum Finish: Two-coat fluoropolymer .
 - 1. Color: White .

2.5 MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 coating designation.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- C. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
- E. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.

2.6 MISCELLANEOUS MATERIALS

- A. 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 A153/A153M or ASTM F2329.
- B. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.7 FINISHES

- 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 unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Galvanized-Steel Sheet Finishes:
1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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. Coil-Coated Aluminum Sheet Finishes:
1. 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 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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.
- F. Aluminum Extrusion Finishes:
1. 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 . Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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.

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 where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. 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, underlayments, 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 weathertight 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. 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** with no joints within **18 inches** of corners or intersections unless otherwise indicated on Drawings.
 - 2. When ambient temperature at time of installation is between **40 and 70 deg F**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than **1-1/4 inches** for nails and not less than **3/4 inch** for wood screws .
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.
- 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; however, 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.

3.3 INSTALLATION OF ROOF-EDGE SPECIALITIES

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.4 INSTALLATION OF ROOF-EDGE DRAINAGE-SYSTEM

- A. 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 apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion-joint caps.
 - 2. Install continuous leaf guards on gutters with noncorrosive fasteners, for cleaning gutters.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
 - 1. Connect downspouts to underground drainage system indicated.
- D. Conductor Heads: Anchor securely to wall with elevation of conductor top edge 1 inch below gutter discharge.

3.5 INSTALLATION OF REGLETS AND COUNTERFLASHINGS

- A. 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 over top edge of base flashings.

- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with 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. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. 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.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07-7100

SECTION 07-7253 – SNOW GUARDS

PART 1 – GENERAL

1.1 SUMMARY

A. WORK INCLUDES

1. Snow guard that attaches directly to the roof deck.
2. Coordinate with the installation of the roof to assure proper placement of the snow guards.
3. Provide appropriate snow guard and fasteners for the roof system.

B. RELATED SECTIONS

1. Section 07-4113 “Metal Panel Roofing”

1.2 SYSTEM DESCRIPTION

A. COMPONENTS:

1. SnowMax standing seam attachment bracket consists of aluminum block
2. 2 stainless steel set screws
3. 1 stainless steel flat head bolt
4. 1 stainless steel lock washer

B. DESIGN REQUIREMENTS:

1. Spacing to be recommended by manufacturer.
2. Install a minimum of 2 set screws per bracket.

1.3 SUBMITTAL

- A. Submit manufacturer's specifications, standard detail drawings, installation instructions, and recommended layout.

1.4 QUALITY ASSURANCE

- A. Installer to be experienced in the installation of specified roofing material and snow guards for not less than 5 years in the area of the project.

1.5 DELIVERY / STORAGE / HANDLING

- A. Inspect material upon delivery and order replacements for any missing or defective items. Keep material dry, covered and off the ground until installed.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Alpine SnowGuards. A division of Vermont Slate & Copper Services Inc.
289 Harrel St. Morrisville, VT 05661, (888) 766-4273
www.alpinesnowguards.com.
- B. Substitutions: as per Section 01-2500

2.2 MATERIALS

- A. SnowMax- standing seam attachment bracket - 6000 Series Aluminum.
- B. Set Screws- 304 stainless steel 18.8 alloy
- C. Stainless Steel Flat Head Bolt – 304 stainless steel 18.8 alloy
- D. Stainless Steel Lock Washer – 18.8 stainless steel
- E. SnowMax Bar

2.3 FINISH:

- A. Mill Finish – standard

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Substrate
 - 1. Inspect structure on which snow guard system is to be installed and verify that it will withstand any additional loading that it may incur. Notify general contractor of any deficiencies before installing Alpine SnowGuards.
 - 2. Verify that roofing material has been installed correctly prior to installing snow guards.

3.2 INSTALLATION

- A. Comply with architectural drawings and snow guard manufacturer's recommendations for location of system. Comply with manufacturer's written installation instructions for installation and layout.

SECTION 07-8413 - PENETRATION FIRESTOPPING.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
- B. Related Requirements:
 - 1. Section 07-8443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

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

1.4 PROJECT CONDITIONS

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

1.5 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 FILL MATERIALS

- A. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- B. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- C. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- D. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

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

3.4 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.5 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."
- C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."
- D. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing:
 - 1. UL-Classified Systems: Contractor to provide appropriate materials to meet the rating requirements.
- E. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing:

1. UL-Classified Systems: Contractor to provide appropriate materials to meet the rating requirements.
- F. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants:
1. UL-Classified Systems: Contractor to provide appropriate materials to meet the rating requirements.
- G. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants:
1. UL-Classified Systems: Contractor to provide appropriate materials to meet the rating requirements.

END OF SECTION 07-8413

SECTION 07-9200 – JOINT SEALANTS.

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Silicone joint sealants (exterior).
- 2. Latex joint sealants (interior).

B. Related Sections:

- 1. Section 04-2000 "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
- 2. Section 08-8000 "Glazing" for glazing sealants.
- 3. Section 09-2900 "Gypsum Board" for sealing perimeter joints.
- 4. Section 09-3000 "Tiling" for sealing tile joints.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- D. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F .
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and

application, as demonstrated by joint–sealant manufacturer, based on testing and field experience.

- B. Liquid–Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid–applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
 - 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- C. Stain–Test–Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Single–Component, Nonsag, Neutral–Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
 - 1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. BASF Sonolastic or approved equal.

2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. Pecora
 - b. Dow Corning
 - c. Tremco

2.4 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.

- d. Exterior insulation and finish systems.
3. Remove laitance and form-release agents from concrete.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

3.4 FIELD QUALITY CONTROL

- A. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations include but are not limited to:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints in exterior insulation and finish systems.
 - d. Joints between different materials listed above.
 - e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
 2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 50.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations include but are not limited to:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 2. Joint Sealant: Latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors or painted to match surrounding colors if directed by Architect.

END OF SECTION 07-9200

SECTION 08-1113 – STEEL DOORS AND FRAMES.

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Furnish and install hollow metal frames, borrowed lights, and hollow metal doors as shown on the drawings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 4 Section "Unit Masonry" for building anchors into and grouting frames in masonry construction.
 - 2. Division 8 Section "Flush Wood Doors" for hollow-core and solid-core wood doors installed in steel frames.
 - 3. Division 8 Section "Door Hardware" for door hardware and weatherstripping.
 - 4. Division 8 Section "Glazing" for glass in steel doors and sidelights.
 - 5. Division 9 Section "Gypsum Board Assemblies" for spot grouting frames in gypsum board partitions.
 - 6. Division 9 Section "Painting" for field painting primed doors and frames.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- C. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings. Include the following information:
 - 1. Material thickness and/or gauge.
 - 2. Door core material.

3. Fabrication and installation details.
4. Mortises and reinforcements.
5. Anchorage types.
6. Locations of exposed fasteners.
7. Glazed, louvered and paneled openings.
8. Mounting locations of standard hardware.
9. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.
- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E 152, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- C. This project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

1.5 MANUFACTURER QUALIFICATIONS

- A. Manufacturer must be a member in good standing of the Steel Door Institute (SDI.)

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to promote air circulation.

1.7 WARRANTY

- A. All doors and frames shall be warranted in writing by the manufacturer against defects in materials and workmanship for a period of one (1) year commencing on the date of final completion and acceptance.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Steel Doors and Frames:
 - a. Amweld
 - b. Curries Company
 - c. Ceco Corporation
 - d. Steelcraft.
 - e. Mesker

2.2 MATERIALS

- A. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366, commercial quality, or ASTM A 620, drawing quality, special killed.
- B. Galvanized Steel Sheets: Zinc-coated carbon steel complying with ASTM A 526, commercial quality, or ASTM A 642, drawing quality, hot-dip galvanized according to ASTM A 525, with A 60 or G 60 coating designation, mill phosphatized.
- C. Supports and Anchors: Fabricated from not less than 0.0478-inch-thick steel sheet; 0.0516-inch-thick galvanized steel where used with galvanized steel frames.
- D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.
- E. 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 25 percent.

2.3 DOORS

- A. Provide 1 3/4" thick doors of ANSI A250.8 grades and models specified below. Provide door face types as shown on the drawings.
1. Interior Doors: Level 2, Model 2 – Seamless
 - a. Manufacturers:
 - 1) Amweld: 17LE-16
 - 2) Ceco: Regent-16-SEM
 - 3) Curries: 707N-16
 - 4) Steelcraft: LF16
 - 5) Mesker: N-S Sereis

2. Exterior Doors: Level 3, Model 2 – Seamless. Insulate exterior doors with a solid slab of expanded polystyrene or polyurethane foam permanently bonded to the inside of each face skin. Close the top of all doors flush by the addition of a 16-gauge screwed-in top cap, sealed to prevent water infiltration.
 - a. Manufacturers:
 - 1) Amweld: 17LE-16
 - 2) Ceco: Legion-16-SEM
 - 3) Curries: 707N-16
 - 4) Steelcraft: LF16
 - 5) Mesker: N-S Series
3. Security Doors: Level 3, Model 2 – Seamless
 - a. Manufacturers:
 - 1) Amweld: 05WE-14
 - 2) Ceco: Restrictor – 14
 - 3) Curries: 847-14
 - 4) Steelcraft: B14
 - 5) Mesker: ST Series
4.
 - B. Bevel doors 1/8" in 2". Provide a full height 14-gauge hinge rail reinforcement channel, or individual 7 gauge hinge reinforcements.
 - C. All doors must conform to ANSI-A250.4 Level "A" criteria and shall be tested to 1,000,000 operating cycles and 23 twist tests. Certification of Level "A" doors is to be submitted with approval drawings by supplier upon request.

2.4 FRAMES

1. Provide hollow metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the drawings and schedules. Conceal fastenings unless otherwise indicated.
 2. Interior Frames: Level 2, 16-gauge
 3. Exterior Frames: Level 2, 14-gauge
 4. Security Frames: Level 3, 12-gauge
 - a. Amweld: 400 Series
 - b. Ceco: SF Series
 - c. Curries: M Series
 - d. Steelcraft: F Series
 - e. Mesker: F Series
- B. Fabricate frames with mitered or coped corners. Fully weld the face joints, grind smooth, and re-prime the welded areas. Finish product must be smooth and flat, with

a neatly filed corner. Frames that are excessively ground or “dished”, or that do not have neatly filed edges at the inside corner will be rejected.

- C. Provide minimum 7 gauge hinge reinforcements, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.
- D. Provide temporary shipping bars.
- E. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.
- F. Provide minimum 0.0179” thick steel plaster guards or mortar boxes at back of hardware cutouts.
- G. Provide a minimum of six loose jamb anchors per frame. Provide anchor types to suit the indicated wall construction. Provide welded base anchors for attaching the frames to the floor.

2.5 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment to assure proper assembly at the project site. Comply with the requirements of ANSI A250.8.
- B. Fabricate exterior doors and frames of A60 galvanized or G60 galvanized steel.
- C. Clearances: No more than 1/8” at jambs and heads except between non fire rated pairs of doors which may be no more than 1/4.” Not more than 3/4” at the bottom of the doors.
- D. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.
- E. Tolerances: Comply with SDI-117.
- F. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
- G. Unless otherwise indicated, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.
- H. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A250.6.
- I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site. Provide internal reinforcements for all doors to receive door closers and exit devices. The use of through bolts to install surface applied hardware is not acceptable.

- J. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- K. Provide glazing stops with minimum 0.0359-inch- thick steel or 0.040-inch- thick aluminum.
- L. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
- M. Provide screw-applied, removable, glazing beads on inside of glass and other panels in doors.
- N. Where louvers are shown or scheduled, provide minimum 18 gauge cold rolled steel frames. Blades must be "Y" shaped minimum 22 gauge cold rolled steel similar to Anemostat model AFDL. Where louvers are shown in fire rated doors provide 18 gauge frame and blades with a fusible link similar to Anemostat model FLDL-UL. Provide hot dipped galvanized louvers at exterior locations. Paint the louvers using the manufacturer's standard primer.
- O. This includes, but is not limited to, door contacts, electric strikes, electric hinges and pivots. Provide conduit from the lower cover boxes to the door contact junction box at the top of the frame. Spot weld guards to frame and secure conduit

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.
- C. Apply primers and organic finishes to doors and frames after fabrication.

2.7 GALVANIZED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so that surfaces are free of oil or other contaminants. After cleaning, apply a conversion coating of the type suited to the organic coating applied over it. Clean welds, HVAC connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- B. Exterior Doors:
 - 1. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for

topcoat. Comply with paint manufacturer's instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

a. Color and Gloss: Custom color to match Architect's sample.

C. Interior and Security Doors:

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

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions of ANSI A250.11, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 1. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
 2. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
 3. Install fire-rated frames according to NFPA 80.
- C. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.
 1. Fire-Rated Doors: Install with clearances specified in NFPA 80.

3.2 ADJUSTING AND CLEANING

- A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.
- C. Maintain the materials per SDI-124.

END OF SECTION 08-1113

SECTION 08-1416 – 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. This Section includes the following:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Light frames for flush wood doors.
- B. Related Sections include the following:
 - 1. Division 6 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches for both flush wood doors and architectural woodwork.
 - 2. Division 8 Section "Glazing" for glass view panels in flush wood doors.
 - 3. Division 8 Section "Stile and Rail Wood Doors".

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, and louvers.
 - 1. 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. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire ratings for fire doors.
- C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
 - 1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.
- D. Samples for Verification: As follows:

1. Corner sections of doors approximately 8 by 10 inches with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the following standard:
 1. WDMA Quality Standard: WDMA I.S.1A "Industry Standard for Architectural Wood Flush Doors" for grade of door, core, construction, finish, and other requirements.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
 1. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.
 2. Comply with WIC's Technical Bulletin 420-R for delivery, storage, and handling of doors.
- B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

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. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not comply with tolerances in referenced quality standard.
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 after the date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

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:
1. Flush Wood Doors:
 - a. Eggers Industries; Architectural Door Division.
 - b. Graham
 - c. Mohawk Flush Doors, Inc.
 - d. Weyerhaeuser Co.
 - e. Marchfield – Algoma

2.2 DOOR CONSTRUCTION, GENERAL

- A. Doors for Transparent Finish: Comply with the following requirements:
1. Grade: Premium Grade A Faces with manufacturer's standard five (5) ply construction; minimum 1/8" thick.
 2. Faces: Plain Sliced Select White Oak; minimum 1/50" thick at 12% moisture content after finish sanding. Architect to select stain from manufacturer's standards.
 3. Match between Veneer Leaves: Book Matched.
 4. Match within Door Faces: Balance match.
 5. Pair and Set Match: Provide for pairs of doors and for doors hung in adjacent sets.
 6. Stiles: Minimum 1" stiles on the hinge stile and 13/16" minimum on the lock stile; provide hardwood stiles which match the door veneer.

2.3 SOLID-CORE DOORS

- A. Particleboard Cores: Comply with the following requirements:
1. Particleboard: WDMA I.S. 1A-97 and ANSI-A208.1, Grade 1-LD, bonded to the door faces, stiles and rails using a Type I adhesive. Components are to be assembled to meet or exceed 20 minute fire door specifications for UL10c fire test requirements.
 2. Blocking: Provide wood blocking at particleboard-core doors as follows:
 - a. 5-inch top-rail blocking, at doors indicated to have closers.
 - b. 5-inch bottom-rail blocking, at exterior doors and doors indicated to have kick, mop, or armor plates.
 - c. 5-inch midrail blocking, at doors indicated to have exit devices.
- B. Interior Veneer-Faced Doors: Comply with the following requirements:
1. Core: Particleboard core.
 2. Construction: Five plies.
- C. Fire-Rated Doors Over 20 Minutes: Comply with the following requirements:
1. Construction: Supply fire resistive composite mineral core construction to provide the fire rating indicated, bonded to door faces, stiles and rails using a Type I adhesive. Assemble components to meet or exceed fire door specifications for UL10c fire test requirements.
 2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated and as follows:
 - a. 5-inch top-rail blocking.
 - b. 5-inch bottom-rail blocking, at doors indicated to have kick, mop, or armor plates.
 - c. 4-1/2-by-10-inch lock blocks.
 - d. 5-inch midrail blocking, at doors indicated to have exit devices.
 - e. As necessary to eliminate need for through-bolting hardware.
 3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.
 4. Pairs: Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

2.4 LIGHT FRAMES

- A. Wood-Veneered Beads for Light Openings in Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

2.5 FABRICATION

- A. Fabricate flush wood doors in sizes indicated for Project site fitting.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 - 1. Comply with clearance requirements of WDMA I.S. 1A-97 for fitting. Comply with requirements of NFPA 80 for fire-rated doors.
- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Louvers: Factory install louvers in prepared openings.

2.6 SHOP PRIMING

- A. Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified in the following:
 - 1. Division 9 Section "Painting."

2.7 FACTORY FINISHING

- A. General: Comply with referenced quality standard's requirements for factory finishing.
- B. Finish wood doors at factory.
- C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
 - 1. Grade: Premium.
 - 2. Finish: Per WDMA I.S. 1A-97, Section G-15, Factory Finishing for Premium Grade factory finish systems.
 - 3. Staining: As selected by Architect from manufacturer's full range of colors.
 - 4. Effect: Semifilled finish.
 - 5. Sheen: Satin.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, WDMA-1.S.1A, and as indicated .
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

3.3 ADJUSTING AND PROTECTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08-1416

SECTION 08-1423 - ALUMINUM-CLAD WOOD COMMERCIAL OUT-SWING FRENCH DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-clad wood commercial out-swing French hinged doors.

1.2 RELATED SECTIONS

- A. Section 07270 (07 27 00) - Air Barriers: Water-resistant barrier.
- B. Section 07920 (07 92 00) - Joint Sealants: Sealants and caulking.
- C. Section 08710 (08 71 00) - Door Hardware.

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM C 1036 - Flat Glass.
 - 3. ASTM C 1048 - Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. ASTM D 1149 - Rubber Deterioration – Surface Ozone Cracking in a Chamber.
 - 5. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.
 - 6. ASTM D 3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 - 7. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - 8. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 - 9. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 - 10. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 - 11. ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 - 12. ASTM G 85 - Modified Salt Spray (Fog) Testing.
- C. Window and Door Manufacturers Association (WDMA):
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440 – North American Fenestration Standard/Specification for windows, doors and skylights
 - 2. WDMA I.S.4 - Industry Specification for Preservative Treatment for Millwork.

1.4 PERFORMANCE REQUIREMENTS

- A. Doors not rated due to 0 psf water performance with low profile sill.
- B. Door Unit Air Leakage, ASTM E 283, 1.57 psf (25 mph): 0.15 cfm per square foot of frame or less.

1.5 SUBMITTALS

- A. Comply with Division 1 requirements.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
- D. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Mockup:
 - 1. Approved mockup shall represent minimum quality required for the Work.
 - 2. Approved mockup shall [not] remain in place within the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
- B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.
- C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Pella Corporation, 102 Main Street, Pella, Iowa 50219. Toll Free (800) 54-PELLA. Phone (641) 621-1000. Website www.pella.com.
- B. Substitutions as per Section 01-2500.

2.2 ALUMINUM-CLAD WOOD COMMERCIAL OUT-SWING FRENCH HINGED DOORS

- A. Aluminum-Clad Wood Commercial Out-Swing French Hinged Doors: Architect Series factory-assembled aluminum-clad wood doors with outward-swing door panels installed in frame.
- B. Frame:
 - 1. Select woods, water-repellent, preservative-treated with EnduraGuard® in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the frame.
 - 2. Interior Exposed Surfaces: Douglas Fir veneered and edge-banded with no visible fastener holes.
 - 3. Exterior Surfaces: Clad with aluminum at head and jambs.
 - 4. Metal Sill: Solid aluminum, ADA approved, low profile.
 - a. Finish: Mill finish
 - 5. Overall Frame Depth: extension jambs as required to match details
- C. Door Panel:
 - 1. Select woods, water-repellent, preservative-treated with EnduraGuard in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to

the panel.

2. Panels: Three-ply construction. Randomly finger-jointed blocks laminated with water-resistant glue.
3. Interior Exposed Surfaces: Pine core veneered with Douglas Fir, with glass stops.
4. Exterior Surfaces: Clad with aluminum.
5. Intermediate Bar: 5-1/4 inches high.
6. Corners: Urethane-sealed and secured with metal fasteners.
7. Sash Thickness: 2-1/16 inches (52 mm).

D. Weather Strip:

1. Dual-durometer extruded polymer along jambs, head and sill.
2. Dual-durometer extruded polymer rainscreen along top and sides of panel.
3. Bristle rainscreen along bottom of panel.

2.3 GLAZING

A. Glazing:

1. Float Glass: ASTM C 1036, Quality 1.
 - a. Tempered Glass: ASTM C 1048.
2. Type: Urethane-glazed 13/16-inch, dual-seal, fully tempered, insulating glass, multi-layer Low-E coated with argon.

2.5 HARDWARE

A. Hinges:

1. Doors 6' 10" and under frame height will have three (3) ball-bearing hinges.
2. Doors over 6' 10" frame height up to and including 8' 0" frame height will have four (4) ball bearing hinges.
3. Finish: compliments the finish of the sill.

B. Hardware: see section 08-7100

2.6 TOLERANCES

A. Doors shall accommodate the following opening tolerances:

1. Vertical Dimensions Between High and Low Points: Plus 1/8 inch, minus 0 inch.
2. Width Dimensions: Plus 1/8 inch, minus 0 inch.
3. Building Columns or Masonry Openings: Plus or minus 1/8 inch from plumb.

2.7 FINISH

A. Exterior Finish System: Pella EnduraClad Plus.

1. Exterior aluminum surfaces shall be finished with the following multi-stage system:
 - a. Clean and etch aluminum surface of oxides.
 - b. Pre-treat with chrome phosphate conversion coating.
 - c. Pre-treat with chromic acid sealer/rinse.
 - d. Top coat with baked-on 70% fluoropolymer-based enamel.
2. Color: Classic White
3. Performance Requirements: Exterior aluminum finishes shall meet or exceed all performance requirements of AAMA 2605.

C. Interior Finish: Factory finished stain. Color: Provincial stain

2.8 INSTALLATION ACCESSORIES

A. Flashing/Sealant Tape: Pella SmartFlash.

1. Aluminum-foil-backed butyl window and door flashing tape.

2. Maximum Total Thickness: 0.013 inch.
 3. UV resistant.
 4. Verify sealant compatibility with sealant manufacturer.
- B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
- C. Exterior Perimeter Sealant: "Pella Window and Door Installation Sealant" or equivalent high quality, multi-purpose sealant as specified in the joints sealant section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and approved shop drawings.
- B. Install doors to be weather-tight and freely operating.
- C. Maintain alignment with adjacent work.
- D. Secure assembly to framed openings, plumb and square, without distortion.
- E. Integrate door system installation with exterior weather-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with weather-resistant barrier using watershed principles in accordance with door manufacturer's instructions.
- F. Place interior seal around door perimeter to maintain continuity of building thermal and air barrier using backer rod and sealant.
- G. Seal door to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
- H. Leave doors closed.

3.3 FIELD QUALITY CONTROL

- A. Field Testing: manufacturer's representative to review installation for quality assurance.

3.4 CLEANING

- A. Clean door frames and glass in accordance with Division 1 requirements.
- B. Do not use harsh cleaning materials or methods that would damage finish.
- C. Remove labels and visible markings.

3.5 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08-5213 - ALUMINUM-CLAD WOOD CASEMENT WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-clad wood casement windows.

1.2 RELATED SECTIONS

- A. Section 07270 (07 27 00) - Air Barriers: Water-resistant barrier.
- B. Section 07920 (07 92 00) - Joint Sealants: Sealants and caulking.

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society for Testing and Materials (ASTM):
 1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 2. ASTM C 1036 - Flat Glass.
 3. ASTM C 1048 - Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.
 4. ASTM D 1149 - Rubber Deterioration – Surface Ozone Cracking in a Chamber.
 5. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.
 6. ASTM D 3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 7. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.
 8. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 9. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 10. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 11. ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 12. ASTM G 85 - Modified Salt Spray (Fog) Testing.
- C. Screen Manufacturers Association (SMA):
 1. SMA 1201 - Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
- D. Window and Door Manufacturers Association (WDMA):
 1. AAMA/WDMA/CSA 101/I.S.2/A440 – North American Fenestration Standard/Specification for windows, doors and skylights
 2. WDMA I.S.4 - Industry Specification for Preservative Treatment for Millwork.

1.4 PERFORMANCE REQUIREMENTS

- A. Windows shall be Hallmark certified to specifications in accordance with ANSI/AAMA/WDMA 101/I.S.2/A440-08 or ANSI/AAMA/WDMA 101/I.S.2/A440-11.

- B. Window Unit Air Leakage, ASTM E 283, 1.57 psf (25 mph): 0.05 cfm per square foot of frame or less.
- C. Window Unit Water Penetration: No water penetration through window unit when tested in accordance with ASTM E 547, under static pressure of 7.5 psf (52 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.5 SUBMITTALS

- A. Comply with Division 1 requirements.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
- D. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Mockup:
 - 1. Provide sample installation for field testing window performance requirements and to determine acceptability of window installation methods.
 - 2. Approved mockup shall represent minimum quality required for the Work.
 - 3. Approved mockup shall remain in place within the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
- B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.
- C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Pella Corporation, 102 Main Street, Pella, Iowa 50219. Toll Free (800) 54-PELLA. Phone (641) 621-1000. Website www.pella.com.
- B. Substitutions as per section 01-2500.

2.2 ALUMINUM-CLAD WOOD CASEMENT WINDOWS

- A. Aluminum-Clad Wood Casement Windows: Factory-assembled aluminum-clad wood windows with outward-opening sash installed in frame and fixed units.
- B. Frame:
 - 1. Select woods, water-repellent, preservative-treated with EnduraGuard® in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the frame.
 - 2. Interior Exposed Surfaces: Douglas Fir.
 - 3. Exterior Surfaces: Clad with aluminum.

4. Overall Frame Depth: provide extension jambs as required by details
5. Factory-Jamb extensions available to adapt door to wall thickness between 4-9/16" (116 mm) to 7" (178 mm).
6. Factory-applied fold-out installation fins with flexible fin corners.
7. Factory-applied aluminum exterior trim with finish to match exterior.

C. Sash:

1. Select woods, water water-repellent, preservative-treated with EnduraGuard in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the sash.
2. Interior Exposed Surfaces: Douglas Fir.
3. Exterior Surfaces: Clad with aluminum, lap-jointed at corners.
4. Corners: Mortised and tenoned, glued and secured with metal fasteners.
5. Sash Thickness: 1-3/4 inches (45 mm).

D. Weather Stripping:

1. Dual weather stripping.
2. Continuous, flexible, Santoprene material in dual-durometer design.
3. Units shall have welded corners, compressed between frame and sash for positive seal on all 4 sides.
4. Secondary thermoplastic vulcanizate (TPV) leaf-type weather strip between edge of sash and frame.
5. Santoprene bulb-type weather strip between edge of sash and frame on top side.

2.3 GLAZING

A. Glazing:

1. Float Glass: ASTM C 1036, Quality 1.
 - a. Tempered Glass: ASTM C 1048.
2. Type: Silicone-glazed 11/16-inch dual-seal, multi-layer Low-E coated with argon.

2.4 OPTIONS

A. Insect Screens: Vivid View®.

1. Compliance: ASTM D 3656 and SMA 1201.
2. Screen Cloth: Vinyl-coated fiberglass, 21/17 mesh, with minimum 78 percent light transmissivity.
3. Set in aluminum frame fitted to inside of window.
4. Complete with necessary hardware.
5. Screen Frame Finish: Baked enamel.
 - a. Color: Brown or white depending on location.

2.5 HARDWARE

A. Operator:

1. Steel worm-gear operator with hardened gears.
2. Operator Base: Zinc die cast with painted finish.
3. Operator Linkage, Hinge Slide, and Hinge Arms: Stainless steel.
4. Exposed Fasteners: Stainless steel.
5. External Hardware Salt Spray Exposure, ASTM B 117: Exceed 1,000 hours.

B. Hardware Style: Saldo

C. Crank Handle Finish

1. Integrated Folding Crank: Baked enamel white, east addition. Baked enamel oil-rubbed bronze west addition.

- D. Locking System: SureLock System.
 - 1. Single-handle locking system.
 - 2. Operate positive-acting arms that reach out and pull sash into locked position.
 - 3. Casement Windows: One installed on sash 29 inches and smaller in frame height, 2 unison operating locks installed on sash over 29 inches in frame height.
 - 4. Lock Handle Finish: Baked enamel white, east addition. Baked enamel oil-rubbed bronze west addition.
- E. Limited Opening Device: Optional factory applied limited opening hardware available for vent units in stainless steel; nominal 3" opening.

2.6 TOLERANCES

- A. Windows shall accommodate the following opening tolerances:
 - 1. Vertical Dimensions Between High and Low Points: Plus 1/4 inch, minus 0 inch.
 - 2. Width Dimensions: Plus 1/4 inch, minus 0 inch.
 - 3. Building Columns or Masonry Openings: Plus or minus 1/4 inch from plumb.

2.7 FINISH

- A. Exterior Finish System: Pella EnduraClad Plus.
 - 1. Exterior aluminum surfaces shall be finished with the following multi-stage system:
 - a. Clean and etch aluminum surface of oxides.
 - b. Pre-treat with chrome phosphate conversion coating.
 - c. Pre-treat with chromic acid sealer/rinse.
 - d. Top coat with baked-on 70% fluoropolymer-based enamel.
 - 2. Color: Classic White
 - 3. Performance Requirements: Exterior aluminum finishes shall meet or exceed all performance requirements of AAMA 2605.
- B. Interior Finish: Factory finished with 1 prime coat and 1 top coat of White east addition. Factory finished Provincial stain west side addition.

2.8 INSTALLATION ACCESSORIES

- A. Flashing/Sealant Tape: Pella SmartFlash.
 - 1. Aluminum-foil-backed butyl window and door flashing tape.
 - 2. Maximum Total Thickness: 0.013 inch.
 - 3. UV resistant.
 - 4. Verify sealant compatibility with sealant manufacturer.
- B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
- C. Exterior Perimeter Sealant: "Pella Window and Door Installation Sealant" or equivalent high quality, multi-purpose sealant as specified in the joints sealant section.

2.9 SOURCE QUALITY CONTROL

- A. Factory Testing: Factory test individual standard operable windows for air infiltration in accordance with ASTM E 283, to ensure compliance with this specification.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions and approved shop drawings.
- B. Install windows to be weather-tight and freely operating.
- C. Maintain alignment with adjacent work.
- D. Secure assembly to framed openings, plumb and square, without distortion.
- E. Integrate window system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using watershed principles in accordance with window manufacturer's instructions.
- F. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using backer rod and sealant
- G. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
- H. Leave windows closed and locked.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's representative to review installation for quality assurance.

3.4 CLEANING

- A. Clean window frames and glass in accordance with Division 1 requirements.
- B. Do not use harsh cleaning materials or methods that would damage finish.
- C. Remove labels and visible markings.

3.5 PROTECTION

- A. Protect installed windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 08-7100 - DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hardware for swinging Aluminum, Hollow Metal and Wood Door Openings.

B. Related Sections:

1. Section 01 25 13 – Product Substitution Procedures
2. Section 06 20 00 – Finish Carpentry
3. Section 08 11 13 – Hollow Metal Doors and Frames
4. Section 08 14 16 – Flush Wood Doors
5. Section 08 41 13 – Aluminum – Framed Entrances and Storefronts
6. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables

1.2 REFERENCES

A. Use the following references to properly detail, schedule, furnish and install finish hardware items.

1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives (2007)
2. DHI Installation Guide for Doors and Hardware (1984)
3. DHI Sequence and Format for the Hardware Schedule (1996)
4. ANSI/BHMA A156.4 – Door Controls – Closers (2013)
5. ANSI/BHMA A156.2 – Bored and preassembled Locks and Latches (2011)
6. ANSI/BHMA A156.13 – Mortise Locks and Latches Series 1000 (2012)
7. ANSI/BHMA A156.18 – Materials and Finishes (2012)

1.3 SUBMITTALS

A. Schedule:

1. Provide submittals in accordance with 01 33 00 – Submittal Procedures.
2. Provide hardware schedule in vertical format on 8-1/2-inch by 11-inch paper or electronic format. Conform to DHI publication Sequence and Format for Hardware Schedule using Architect's door numbers and hardware set numbers.
3. Provide elevation drawings for openings with electrical hardware and access control devices with each hardware schedule. Include illustration of opening, operational description, electrified hardware components, legend, approximate mounting location and size of enclosures, size and quantity of conductors, facility name and date.

B. Product Data: Provide one set of manufacturer's catalog and technical data for each hardware item used, highlighting design, function, fasteners, accessories, and options to facilitate review with each hardware schedule submitted.

C. Templates: Provide two sets of manufacturer's templating information for mortised and template hardware upon receipt of approved hardware schedule to the door and frame supplier(s). Include requirements for internal reinforcements required for surface mounted hardware.

D. Wiring Diagrams:

1. Three sets point-to-point diagrams specially developed for each opening that requires electrical hardware, with hardware delivery to jobsite. Reference elevation drawings submitted with hardware schedule using Architect's opening numbers.
 2. Three sets riser diagrams for openings requiring power supplies or access control. Include placement of power supplies, distance of wire runs from power supply, cable quantity and number and gauges of wires.
- E. Keying Schedule: Arrange meeting with Owner, Architect and finish hardware supplier to determine keying requirements immediately upon receipt of finish hardware schedule.

1.4 CLOSEOUT SUBMITTALS

- A. Furnish operations and maintenance manual in accordance with Section 01 78 28 – Operations and Maintenance Data and as follows:
1. Furnish one copy of manual at date of Substantial Completion in a 2-1/2-inch thick binder labeled with project information, date and name and contact information for the hardware supplier.
 2. Include in manual:
 - a. Copy of approved hardware schedule, including door numbers and locations. Highlight fire rated door to aid in annual fire door inspection.
 - b. Copy of approved keying schedule.
 - c. Catalog data for each product.
 - d. As-installed "wiring diagrams" for each opening connected to power.
 - e. Parts list for locksets, exit devices, and door closers.
 - f. Installation templates and instructions.
 - g. Warranty information.
 - h. Name, address, and phone number of local representatives for each manufacturer.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Materials:
1. Screws and Fasteners: Fifty of each screw and fastener required for general maintenance of hinges, locks, closers, exit devices, and sealing systems.
 2. Deliver to Owner remaining finish hardware fasteners and special installation tools upon completion of Project.

1.6 QUALITY ASSURANCE

- A. Supplier:
1. Furnish hardware from recognized supplier who has warehousing facility within 100 miles of project location, and who has actively supplied hardware for similar projects in the vicinity for a minimum of five years.
 2. Supplier shall employ an Architectural Hardware Consultant (AHC), as certified by Door and Hardware Institute, on staff full time to administer and supervise project.
- B. Installer: Install hardware using installers who have actively installed commercial door hardware for a minimum of five years, and are familiar with hardware installation of type required on this Project.

C. Pre-Installation Meeting:

1. Prior to installation of hardware, arrange for manufacturer’s representatives of locksets, door closers, and exit devices to hold a jobsite meeting to instruct the installing personnel on the proper installation of their products.
2. Send a letter of compliance, indicating when this meeting was held, and who was in attendance, to the Architect and Owner.

D. Fire Rated Door Openings:

1. Comply with NFPA 80.
2. Furnish nationally recognized testing agency label or stamp on hardware for labeled openings.
3. Only labeled locks or latches or fire exit hardware can be used on fire rated openings.
4. Where UL requirements conflict with Drawings or Specifications, furnish hardware conforming to the UL requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Jointly check in hardware, upon delivery to jobsite, against approved hardware schedule with hardware supplier. Record shortage or damage and replace or repair as necessary.
2. Deliver hardware to be installed during fabrication of doors and frames, to manufacturer.

B. Storage:

1. Store hardware in a secure, dry, temperature controlled room on shelving to protect against loss, theft and damage.
2. Store items too long for shelving on pallet, off the floor.

C. Marking and Packaging:

1. Deliver hardware to jobsite in manufacturer’s original packaging marked to correspond with approved hardware schedule with Architect’s door numbers and hardware sets.
2. Mark all locksets, exit devices, cylinders, auxiliary hardware and key switches with keyset symbol.
3. Replace any wet or damaged packaging with new.

1.8 WARRANTY

A. Furnish warranties in accordance with Section 01 78 36 – Warranties. Extended or limited warranties shall be as follows:

1. Furnish minimum ten year factory warranty on door closers, against defects in material and workmanship, from date of substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers were used in the hardware sets.

- | | | |
|------------------------|---------|----|
| 1. Butt Hinges | Stanley | ST |
| 2. Continuous Hinges | Stanley | ST |
| 3. Locks and Latchsets | Best | BE |

4. Cylinders and Cores	Best	BE
5. Surface Closers	Dorma	DM
6. Exit Devices	Precision	PR
7. Overhead Stop/holders	ABH	AB
8. Door Pulls	Trimco	TR
9. Flushbolts	Trimco	TR
10. Protection Plates	Trimco	TR
11. Wall/Floor Stops	Trimco	TR
12. Thresholds and Gasketing	National Guard	NA
13. Silencers	Trimco	TR

- B. Submit requests for substitution in accordance with Section 01 25 13 Product Substitution requirements and as follows:
1. Provide catalog data with product information highlighted or bubbled to facilitate review. Product must meet or exceed level or design intended and/or function established by specified products.

2.2 MATERIALS

A. Screws and Fasteners:

1. Provide manufacturer’s recommended fasteners of proper type, material and finish.
2. Provide self-tapping screws for sweeps and stop applied weatherstripping.
3. Utilize through-bolts for the attachment of door closers and exit devices on non-reinforced doors only. Finish: match door face.
4. Exposed screw heads: phillips type.

C. Hinges:

1. Type:
 - a. Five-knuckle, full mortise, ball bearing.
 - b. Furnish heavy weight hinges on heavy doors and doors expected to have high frequency use.
2. Quantity:
 - a. One pair of hinges for all doors up to 5 feet high. Furnish one additional hinge for every 2'-6" in height or fraction thereof.
3. Size:
 - a. For 1-3/4-inch thick doors up to 3 feet wide: 4 ½-inches high
 - b. For 1-3/4-inch thick doors over 3 feet wide: 5-inches high
 - c. For all doors over 1-3/4-inches thick: 5-inches high
 - d. Size in width shall minimally clear door trim.
4. Application:
 - a. NRP (non-removable pin) at exterior doors and reverse bevel doors with locking hardware.
 - b. Electric hinges: have sufficient number of concealed wires to accommodate electrical function of hardware. Furnish junction box and mortar shield.

5. Acceptable manufacturers and types:

Type	Stanley	McKinney
Standard Weight	FBB179	TB2714
Heavy Weight	FBB168	T4B3786

D. Continuous Hinges:

1. Configuration appropriate for type, inset, and thickness of door. Coordinate with door manufacturer.

2. Meet UL fire label listing requirements at UL rated openings. Include fire pins as required by manufacturer.
3. Acceptable manufacturers and types:

Door Type	Stanley	ABH	Select
Aluminum	661HD	A110HD	SL11HD
Hollow Metal	662HD	A240HD	SL24HD

E. Door Bolts:

1. Flushbolts:
 - a. Manual Flushbolts: Two for inactive leaf of locked pairs of doors at non-occupied rooms.
 - b. Self-Latching Flushbolts: One pair for inactive leaf at pairs of doors where inactive leaf is not required for egress.
 - c. Automatic Flushbolts: One pair at fire rated doors, and occupied rooms required for egress.
 - d. Acceptable manufacturers and types:

Bolt/Door Type	Trimco	Burns	ABH
Manual Metal	3917	590	1855
Manual Wood	3913	591	1857

F. Locksets:

1. Mortise Locks:
 - a. Conform to ANSI/BHMA A156.13, Series 1000 Operational Grade 1.
 - b. Latchbolt with appropriate throw for fire rated doors and pairs of doors in accordance with manufacturers listing.
 - c. Lock functions as specified in hardware schedule.
 - d. Electrical functions as specified in hardware schedule, 24VDC.
 - e. Lever design: 14H
 - f. Backset: 2-3/4-inch
 - g. Strike single door: ANSI 4-7/8-inch with proper lip length to minimally clear trim.
 - h. Strike pair of doors: flat lip strike sized to fit flush with face of door.
 - i. Furnish wrought strike box.
 - j. Acceptable manufacturers and types:

Best	Sargent	Schlage
45H Series	8200 Series	L9000 Series

2. Cylinders:

- a. Provide mortise and rim cylinders and cores from same manufacturer as locksets, for all locksets, exit devices, cylinder dogging, key switches and auxiliary hardware.
- b. Appropriate cam and blocking rings for proper installation

G. Keys & Keying

1. Cylinders: 7-pin, interchangeable core and keyed into a BEST Cormax factory registered Masterkey System.
2. Provide construction cores and keys during construction period. Construction control and operating keys and cores are not part of permanent keying system or furnished on same keyway (or key section) as permanent keying system.
3. Permanent Keys and Cores: Prepare permanent cores and keys in accordance with keying schedule. Provide Masterkeys and other Security Keys.
4. Furnish keys in the following quantities:
 - a. 4 each Masterkeys per new Masterkey set.
 - b. 2 each Change keys each keyed core.
 - c. 6 each Construction Masterkeys.

- d. 2 each Construction Control keys.
- e. 2 each Control keys.
- 5. Install permanent cores in locksets.
- 6. Return construction cores to Hardware Supplier.

H. Exit Devices:

- 1. UL-listed for fire at fire door assemblies, and UL listed for panic at non-rated door assemblies.
- 2. Size exit devices to proper door width and height.
- 3. Stainless Steel deadlocking 3/4 -inch throw latch bolt.
- 4. LBR (less bottom rod) where scheduled to eliminate use of floor mounted strikes.
- 5. Cylinders for exit devices with cylinder dogging or locking trim.
- 6. Electrical functions as scheduled in sets. Provide power supply and power transfer from same manufacturer as electrified exit device.
- 7. Strike: as recommended by manufacturer.
- 8. Lever design: To match lockset trim.
- 9. Acceptable manufacturers and types:

Precision	Dorma	Von Duprin
Apex 2000 Series	9000 Series	98 Series

I. Surface Door Closers:

- 1. Conform to ANSI/BHMA A156.4 Grade 1.
- 2. Heavy duty high silicon aluminum alloy or cast iron body closers.
- 3. Furnish manufacturers recommended size, arms and configuration for door and frame application required.
- 4. Furnish brackets, spacers, support shoes, and plates for complete and proper installation.
- 5. DA (delayed-action) at toilet room doors and as scheduled.
- 6. Acceptable manufacturers and types:

Dorma	Stanley	LCN
8900 Series	CLD-4550 Series	4040XP Series

J. Low Energy Operators:

- 1. By Dormakaba. as specified in Spec Section 08 71 13

K. Overhead Door Stop:

- 1. Provide overhead stop or overhead stop/holder for interior doors as specified. Provide overhead stop for interior doors and at any door that swings more than 140 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop or a floor stop presents a tripping hazard.
- 2. Where overhead holders are specified provide friction type at doors without a closer and positive type at doors with a closer.
- 3. Acceptable manufacturers:

ABH	Rixson	Glynn Johnson
4420 Series	10 Series	450 Series
1020 Series	6 Series	100 Series
9010 Series	9 ADJ Series	Equal

L. Door Trim:

- 1. Provide push plates 6 inches wide x 16 inches high x 0.050 inch thick and beveled 4 edges. Where width of door stile prevents use of 6 inches wide plate, adjust width to fit.

2. Provide pull plates 4 inches wide x 16 inches high x 0.050 inch thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
3. Acceptable manufacturers:

Type	Trimco	Burns	Rockwood
Pull Plate	1014-3B	5421B	126 x 70C
Push Plate	1001-9	56	75E

M. Protection Plates:

1. Where bottom rail allows, furnish 10-inch high kick plates and 10-inch high mop plates.
2. Material: 0.050-inch thick stainless steel plates with four beveled edges.
3. Countersink screw heads at wood doors.
4. Width: 2-inch less door width on stop (push) side and 1-inch less door width on face (pull) side.
5. Acceptable manufacturer and types:

Trimco	Burns	Rockwood
K0050	KP	K1050

N. Door Stops:

1. Convex, cast, wall stops.
2. Furnish fastener suitable for wall condition.
3. Provide wedge type stop for doors with push/pulls.
4. Where wall stops are inappropriate provide universal dome type floor stops.
5. Acceptable manufacturers and types:

Type	Trimco	Burns	Rockwood
Wall Stop	1270CX	560	400

O. Door Position Switch:

1. Provide magnetic switch, concealed three-quarter inch round, Single Pole Double Throw (SPDT) .250mA@ 30VDC for door status monitoring.
2. Acceptable manufacturer's and type:

Dorma	Sentrol	Securitron
MC4	1076C	DPS

P. Thresholds and Gasketing:

1. Thresholds:
 - a. Returned closed ends at openings where threshold extends beyond frame face.
 - b. Bumper threshold with silicone insert where scheduled.
 - c. Acceptable manufacturers and types:

Type	National Guard	Pemko
Bumper	896	2005

2. Gasketing:

- a. Rigid jamb weatherstrip with replaceable neoprene insert.
- b. Include self-adhesive two-sided tape in addition to manufacturer's standard fastener.
- c. Meeting-stile gasketing required at exterior pairs of doors and doors in smoke partitions.
- d. TPE adhesive fire/smoke gasketing at fire and smoke "S" labeled openings
- e. Door sweep with neoprene insert for exterior out-swing doors.
- f. Acceptable manufacturers and types:

Type	National Guard	Pemko
------	----------------	-------

Rigid	700 NA	2891
Smoke	5075	S773
Door Sweep	1015 V	3452-V

Q. Silencers:

1. Grey rubber silencers with injector tool.
2. Three silencers at single doors and two silencers at pairs.
3. Acceptable manufacturers and types:

Trimco	Rockwood	Burns
1229A	608	500

2.3 KEY CONTROL

A. Key cabinet: wall mounted with one hook for each lock or cylinder plus fifty extra hooks.

1. One non-removable security tag and one snap-on link duplicate tag per hook.
2. Furnish tools, instructions sheets and accessories required to complete installation.
3. Owner/Owner’s representative will place keys in cabinet and complete index card furnished with key system.
4. Acceptable manufacturers:

Lund	Telkee	MMF
------	--------	-----

2.4 FINISHES

A. Conform to ANSI/BHMA A156.18.

- | | | |
|----------------------|-----|--------------------------------|
| 1. Butt Hinges | 630 | Stainless Steel |
| 2. Locks and Latches | 626 | Satin Chrome |
| 3. Exit Devices | 630 | Satin Stainless Steel |
| 4. Door Closers | 689 | Spray Painted Aluminum |
| 5. Pull Plates | 630 | Satin Stainless Steel |
| 6. Protection Plates | 630 | Satin Stainless Steel |
| 7. Stops and Holders | 630 | Satin Stainless Steel |
| 8. Thresholds/Gasket | AL | Anodized Mil Finished Aluminum |

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify doors and frames are plumb, square, level and true and free from defects that would prevent proper installation of finish hardware.
- B. Verify power is run to doors requiring electrified hardware.
- C. Wash down masonry walls and complete painting and staining of doors and frames prior to installation of hardware.
- D. Complete finish flooring at doorways.
- E. Correct conditions that inhibit a proper installation before continuing with work.

3.2 INSTALLATION

- A. Install hardware in compliance with the DHI publication, Installation Guide for Doors and Hardware.
- B. Drill and countersink items not factory prepared for fasteners.
- C. Mount closers on room-side of corridor doors, inside of exterior doors, and stair-side of stairway doors. Use necessary arms, brackets, spacers and plates to accommodate auxiliary hardware and special applications.
- D. Install fire door assemblies to maintain clearances at door edge to frame and meeting edge of pairs of doors in compliance with NFPA 80, providing 1/8-inch clearance at the hinge edge, lock edge, head and between pairs. Provide maximum 3/4-inch undercut at door bottom. Where panic thresholds are used, undercut door to allow 1/8-inch clearance between door and threshold.
- E. Trim, cut, and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Set thresholds in bed of mastic sealant, forming tight seal between threshold and surface to which set.
- F. Use only fasteners furnished by manufacturer for installation as recommended by manufacturer.
- G. Install blocking material for all wall mounted door stops at height appropriate to contact door trim.
- H. Install weather-strip prior to installation of door closers and exit devices. Do not cut or notch weather-strip.
- I. Locate electric hinges at second hinge from bottom of frame.
- J. Termination of wiring: Ensure wiring is in place and is connected for proper operation of hardware.

3.3 FIELD QUALITY CONTROL

- A. Verify doors open and close smoothly without rubbing or catching and have positive latching where scheduled. Verify fire rated doors are installed with clearances in compliance with NFPA 80.
- B. Test electrified hold open devices tied into fire alarm system to confirm release upon activation of fire alarm. Test electrified hardware and access control to verify systems operate as directed in mode of operation. Where hardware is found to be inoperable, repair or replace with new.

3.4 ADJUSTING AND CLEANING

- A. Upon substantial completion, make final adjustments to door closers and other items of hardware after balance of heating and ventilating equipment to ensure doors close and latch properly.
- B. Clean and polish all exposed hardware surfaces in accordance with manufacturer's recommended procedures.
- C. Clean or repair pencil or tool marks from adjacent surfaces damaged or soiled by work of this Section.
- D. Recycle cardboard boxes and paper products used in packaging and transport of finish hardware.

3.5 PROTECTION

- A. Remove hardware prior to painting or finishing door and frame. Wrap or mask exposed hardware that cannot be removed until date of substantial completion to avoid exposure to paint, solvents, and abuse.
- B. Repair or replace hardware damaged during construction at least two weeks prior to date of substantial completion.

3.6 SCHEDULES

- A. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
- B. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

Manufacturer List

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Others
DM	Dorma Door Controls
NA	National Guard
PR	Precision
ST	Stanley
TR	Trimco
WIKK	Wikk Industries Inc.

Option List

<u>Code</u>	<u>Description</u>
C	QUICK CONNECT WIRING OPTION
C	Quick Connect Wiring System
N	Thru-Bolt w/ Flow-Thru
DA	ADJUSTABLE DELAYED ACTION
LD	Less Dogging
CSK	COUNTER SINKING OF KICK and MOP PLATES

LBR	LESS BOTTOM ROD
MLR	MOTORIZED LATCH RETRACTION
RQE	REQUEST TO EXIT
SIA	ABRASIVE COATING-5" WIDTH-AL OR SS
VIB	Double Visual Indicator Option
7/8"LTC	7/8" Lip-To-Center Strike
B4E-HEAVY-KP	BEVELED 4 EDGES - KICK PLATES
1/4-20 SSMS/EA	STAINLESS MACHINE SCREWS/EXPANSION ANC.

Finish List

<u>Code</u>	<u>Description</u>
AL	Aluminum
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
GREY	Grey
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Hardware Sets

SET #01 - Exterior Entry - Card Reader - Operator

Doors: 101

1	Exit Device	C MLR 2203	630	PR
1	Exit Device	C MLR 2202	630	PR
1	Rim Cylinder	12E-72 PATD	626	BE
2	Door Pull	AP231 18" C to C N Mtg	630	TR
2	Panic Guard	PG8002 (One Piece)	630	TR
1	Auto Operator & Actuators (2)	See Section 08 71 13 Dormakaba Operator	689	DM
1	Closer	8916 S-ISJ (Reveal as REQ'D)	689	DM
NOTE: Provide adequate reinforcement and fasteners for proper installation.				
2	Wire Harness	WH-6		ST
2	Power Transfer	EPT-12C		PR
1	Power Supply	RPSMLR2BB		PR
1	Bollard Post	B-6X4-FT-PCEX-SM-RT9	630	WIKK
NOTE: Powder Coat Color TBD By Architect				
2	Door Position Switch	MC4		DM
1	Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
1	Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY
2	Wire Harness	WH-XXP (Length as REQ'D)		ST
2	Wire Harness	WH-192P		ST

NOTE: Hinges, Threshold & Weather-stripping by Door/Frame manufacturer. Coordinate hardware with Door/Frame manufacture. Provide proper hardware blocking and fasteners as required for Door thickness. Operation: Access control

schedules latchbolts of exit devices held in retracted position allowing manual Push / Pull operation of both leaves or automatic operation by use of exterior and vestibule side actuators. In the event of Panic / Lockdown initiation power is cut securing doors from outside. Lockdown activation or button by others. Closed Hours - Presentation of valid credential to card reader retracts exit device latchbolts, then enables exterior actuator allowing entry by pull or automatic operation. Vestibule side actuator always enabled - When activated exit device latchbolt retract then cycles automatic operator allowing egress. Manual egress always allowed. Coordinate wiring and installation with GC / EC / Owner's Security Vendor.

SET #02 - Lobby Auto Operator

Doors: 102

2 Dummy Bar	671DR	630	PR
2 Door Pull	AP231 18" C to C N Mtg	630	TR
1 Auto Operator & Actuators (2)	See Section 08 71 13 Dormakaba Operator	689	DM
1 Closer	8916 S-ISJ (Reveal as REQ'D)	689	DM
NOTE: Provide adequate reinforcement and fasteners for proper installation.			
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY

NOTE: Hinges, Threshold & Weather-stripping by Door/Frame manufacturer. Coordinate hardware with Door/Frame manufacture. Provide proper hardware blocking and fasteners as required for Door thickness. Operation: Doors unlocked for manual Push / Pull operation or automatic operation by use of vestibule or interior lobby actuators that cycles automatic operator allowing ingress or egress. Coordinate wiring and installation with GC / EC / Owner's Security Vendor.

SET #03 - Exterior / Vestibule - Card Reader

Doors: 135A, B01

1 Continuous Hinge	662HD UL	AL	ST
1 Exit Device	2103 X 1703A LD	630	PR
1 Rim Cylinder	12E-72 PATD	626	BE
1 Electric Strike	BES-0162LM		BE
1 Closer	8916 S-DS	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Door Position Switch	MC4		DM
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY
1 Power Supply	POWER SUPPLY BY OWNER'S SECURITY VENDOR		BY
1 Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
1 Threshold	896 S 1/4-20 SSMS/EA SIA	AL	NA
1 Gasketing	700 NA		NA
1 Door Sweep	1015 V		NA
1 Drip Cap	16 A - 4" ODW		NA

NOTE: Operation: Door normally closed and locked. Presentation of valid credential to card reader releases electric strike allowing authorized entry. Mechanical key override. Free egress at all times. All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor. Do not notch perimeter seal, adjust exit device and door closer mounting dimensions.

SET #04 - Vestibule

Doors: 135B

1 Continuous Hinge	662HD UL	AL	ST
1 Dummy Bar	671DR	630	PR
1 Dummy Trim	4902D	630	PR
1 Closer	8916 SPA	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CX	626	TR
1 Gasketing	2525 C		NA

SET #05 - Closet / Break Rm

Doors: 123, 127, 137, 140

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Passage Set	45H-0N14H	626	BE
1 Wall Bumper	1270CX	626	TR
3 Door Silencers	1229A	GREY	TR

NOTE: Where door swing does not allow for a wall bumper furnish "ABH" OH Stop 4020 Series.

SET #05A - Closet

Doors: 117

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Passage Set	45H-0N14H	626	BE
1 Overhead Stop	4420 Series	US32D	AB
3 Door Silencers	1229A	GREY	TR

SET #06 - Conference - Card Reader - STC

Doors: 104A, 104B

4 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Electro-mech Lock	45HW-7DEU14H PATD C RQE	626	BE
1 Closer	8916 AF89	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CX	626	TR
1 Power Transfer	EPT-12C		PR
1 Door Position Switch	MC4		DM
1 Wire Harness	WH-XXP (Length as REQ'D)		ST
1 Wire Harness	WH-6		ST
1 Wire Harness	WH-192P		ST
1 Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
1 Power Supply	POWER SUPPLY BY OWNER'S SECURITY VENDOR		BY
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY

1 Gasketing	5060 B @ Head & Jambs		NA
1 Gasketing	5075 B @ Head & Jambs		NA
2 Acoustic Seal	60FP		NA
1 Door Shoe	12 T6 x STC-FH		NA
1 Threshold	8144 1/4-20 SSMS/EA	AL	NA

NOTE: Install Threshold Smooth Side Up

NOTE: Operation: Door normally closed and locked. Presentation of valid credential to card reader releases secure lever of lockset allowing entry to IT/MECH Room. Mechanical key override. Free egress at all times. "RQE" of lockset to act as request to exit. All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor. Install gasketing to NGP seal set # 4. Coordinate hardware with door manufacturer.

SET #07 - Public Meeting - Card Reader

Doors: 105A

8 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
2 Exit Device	C MLR 2703 X 4903D LBR	630	PR
2 Rim Cylinder	12E-72 PATD	626	BE
2 Closer	8916 SPA	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Wall Bumper	1270CX	626	TR
1 Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
2 Power Transfer	EPT-12C		PR
2 Door Position Switch	MC4		DM
2 Wire Harness	WH-6		ST
2 Wire Harness	WH-192P		ST
2 Wire Harness	WH-XXP (Length as REQ'D)		ST
1 Power Supply	RPSMLR2BB		PR
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY

NOTE: Operation: Unlocked Hours - Doors scheduled to be unlocked by owner's Access System for Push/Pull operation by inside exit device bar or outside door pull. In the event of Panic / Lockdown initiation power is cut securing doors from outside. Lockdown activation or button by others. Locked Hours - Doors scheduled to be closed and locked. Presentation of valid credential to card reader retracts exit device latch bolts to allow authorized entry. Mechanical key override. Free egress at all times. All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor. Coordinate hardware with door manufacturer. Adjust door Stile and Rails dimensions as required for hardware.

SET #08 - Exterior / Public Meeting

Doors: 105B

1 Continuous Hinge	662HD UL	AL	ST
1 Exit Device	2103 LD	630	PR
1 Closer	8916 S-DS	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Door Position Switch	MC4		DM
1 Threshold	896 S 1/4-20 SSMS/EA SIA	AL	NA
1 Gasketing	700 NA		NA
1 Door Sweep	1015 V		NA

1 Drip Cap	16 A - 4" ODW		NA
------------	---------------	--	----

NOTE: All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor. Do not notch perimeter seal, adjust exit device and door closer mounting dimensions.

SET #09 - Storage

Doors: 106

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lockset	45H-7D14H PATD	626	BE
1 Closer	8916 S-ISH	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3 Door Silencers	1229A	GREY	TR

SET #10 - Kitchenette

Doors: 107

6 Hinges	FBB179 4 1/2 X 4 1/2 NRP	US26D	ST
1 Flush Bolt (Top)	3913	626	TR
1 Storeroom Lockset	45H-7D14H PATD 7/8"LTC	626	BE
2 Overhead Holder	9010 A Series	US32D	AB
	NOTE: LHR Inactive Leaf		
1 Gasketing	2525 C		NA
1 Astragal	5070 CL		NA

SET #11 - Janitor

Doors: 109

3 Hinges	FBB179 4 1/2 X 4 1/2 NRP	US26D	ST
1 Storeroom Lockset	45H-7D14H PATD	626	BE
1 Wall Bumper	1270CX	626	TR
3 Door Silencers	1229A	GREY	TR

SET #12 - Men / Women

Doors: 110, 111

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Push Plate	1001-9	630	TR
1 Pull Plate	1014-3B	630	TR
1 Closer	8916 AF89 DA	689	DM
1 Mop Plate	KM050 10" x 1" LDW B4E CSK	630	TR
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CX	626	TR
1 Gasketing	2525 C		NA

SET #13 - Toilet

Doors: 112

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
----------	----------------------	-------	----

1 Privacy Set	45H-0LT14H	626	BE
1 Wall Bumper	1270CX	626	TR
3 Door Silencers	1229A	GREY	TR

SET #14 - Office

Doors: 113, 115, 130, 131, 133, 134, 136, 139

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Office Lockset	45H-7AT14H PATD	626	BE
1 Wall Bumper	1270CX	626	TR
3 Door Silencers	1229A	GREY	TR

SET #15 - Office - OH Stop

Doors: 119

3 Hinges	FBB179 4 1/2 X 4 1/2 NRP	US26D	ST
1 Office Lockset	45H-7AT14H PATD	626	BE
1 Overhead Stop	4020 Series	US32D	AB
3 Door Silencers	1229A	GREY	TR

SET #16 - Office - OH Stop

Doors: 118

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Office Lockset	45H-7AT14H PATD	626	BE
1 Overhead Stop	4020 Series	US32D	AB
3 Door Silencers	1229A	GREY	TR

SET #17 - Admin Gen Office - Card Reader

Doors: 114, 142

4 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Electro-mech Lock	45HW-7DEU14H PATD C RQE	626	BE
1 Closer	8916 S-DS	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CX	626	TR
1 Power Transfer	EPT-12C		PR
1 Door Position Switch	MC4		DM
1 Wire Harness	WH-XXP (Length as REQ'D)		ST
1 Wire Harness	WH-6		ST
1 Wire Harness	WH-192P		ST
2 Remote Release	BY OWNER'S SECURITY VENDOR		BY
1 Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
1 Power Supply	POWER SUPPLY BY OWNER'S SECURITY VENDOR		BY
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY

NOTE: Operation: Door normally closed and locked. Presentation of valid credential to card reader releases secure lever of lockset allowing entry to Room. Mechanical key override. Free egress at all times. "RQE" of lockset to act as request to exit. All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor. Install gasketing to NGP seal set # 4. Coordinate hardware with door manufacturer.

SET #17A - Reception

Doors: 103

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Passage Set	45H-0N14H	626	BE
1 Wall Bumper	1270CX	626	TR
1 Rocker Switch Remote Release	3909S MO		DM
3 Door Silencers	1229A	GREY	TR

NOTE: Momentary Switch for remote release of Door 114. Location of Switch TBD by Architect / EC / Security Vendor.

SET #17B - Office

Doors: 116

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Office Lockset	45H-7AT14H PATD	626	BE
1 Wall Bumper	1270CX	626	TR
1 Rocker Switch Remote Release	3909S MO		DM
3 Door Silencers	1229A	GREY	TR

NOTE: Momentary Switch for remote release of Door 114. Location of Switch TBD by Architect / EC / Security Vendor.

SET #18 - Files

Doors: 122

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Classroom Lockset	45H-7R14H PATD	626	BE
1 Wall Bumper	1270CX	626	TR
3 Door Silencers	1229A	GREY	TR

SET #19 - Closet

Doors: 138

3 Hinges	FBB179 4 1/2 X 4 1/2 NRP	US26D	ST
1 Classroom Lockset	45H-7R14H PATD	626	BE
1 Overhead Stop	4420 Series	US32D	AB
3 Door Silencers	1229A	GREY	TR

SET #20 - Toilet Rm Indicator

Doors: 124, 125

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Privacy Set	45H-0LT14H VIB	626	BE
1 Closer	8916 AF89 DA	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Mop Plate	KM050 10" x 1" LDW B4E CSK	630	TR
1 Wall Bumper	1270CX	626	TR
1 Gasketing	2525 C		NA

SET #21 - I.T/MECH

Doors: 128

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Electro-mech Lock	45HW-7DEU14H PATD C RQE	626	BE
1 Wall Bumper	1270CX	626	TR
1 Door Position Switch	MC4		DM
1 Card Reader	CARD READER BY OWNER'S SECURITY VENDOR		BY
1 Power Supply	POWER SUPPLY BY OWNER'S SECURITY VENDOR		BY
1 Wiring Diagram	WIRING DIAGRAM FURNISHED BY HWDE. SUPPLIER		BY
1 Wire Harness	WH-XXP (Length as REQ'D)		ST
1 Wire Harness	WH-192P		ST
1 Power Transfer	EPT-12C		PR
1 Gasketing	2525 C		NA

NOTE: Operation: Door normally closed and locked. Presentation of valid credential to card reader releases secure lever of lockset allowing entry to IT/MECH Room. Mechanical key override. Free egress at all times. "RQE" of lockset to act as request to exit. All wiring and conduit by electrical contractor. Coordinate all wiring and installation with EC / GC / Security Contractor.

SET #22 - Janitor

Doors: 146

3 Hinges	FBB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Storeroom Lockset	45H-7D14H PATD	626	BE
1 Closer	8916 S-DS	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3 Door Silencers	1229A	GREY	TR

SET #23 - Vault

Doors: 121

NOTE: Existing Door to Remain.

SET #24 - Conference

Doors: 126A, 126C

NOTE: All hardware by sliding door manufacturer.

SET #25 - Fire Pump

Doors: B05

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Storeroom Lockset	45H-7D14H PATD	626	BE
1 Closer	8916 AF89	689	DM
	NOTE: REG ARM MOUNT		
1 Wall Bumper	1270CX	626	TR
1 Drip Cap	16 A - 4" ODW		NA
1 Gasketing	2525 C		NA
1 Door Sweep	101 VA		NA
1 Saddle Threshold	425	AL	NA

SECTION 08-7113 – AUTOMATIC DOOR OPERATORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the following types of automatic door operators:
 - 1. Low-energy door operators for swinging doors.
- B. Related Sections:
 - 1. Division 7 Sections for caulking to the extent not specified in this section.
 - 2. Division 8 Sections for “Aluminum-Framed Entrances and Storefronts” for entrances furnished and installed separately in Division 8 Section.
 - 3. Division 8 Section “Door Hardware” for hardware to the extent not specified in this section.
 - 4. Division 8 Section “Glazing” for materials and installation requirements of glazing for automatic entrances.
 - 5. Division 26 and 28 Sections for electrical connections including conduit and wiring for automatic entrance operators and access-control devices.

1.3 REFERENCES

- A. References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. CUL – Approved for use in Canada.
 - 4. NFPA 70 - National Electrical Code.
 - 5. NFPA 80 - Fire Doors and Windows.
 - 6. NFPA 101 - Life Safety Code.
 - 7. NFPA 105 - Installation of Smoke Door Assemblies.
- B. American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA).
 - 1. ANSI/BHMA A156.19 Standards for Power Assist and Low Energy Power Operated Doors.
- C. Underwriters Laboratories (UL).
 - 1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - 2. UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.
- D. American Association of Automatic Door Manufacturers (AAADM).
- E. American Society for Testing and Materials (ASTM).
 - 1. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - 2. ASTM B209 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.

- F. American Architectural Manufacturers Association (AAMA).
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
- G. National Association of Architectural Metal Manufacturers (NAAMM).
 - 1. Metal Finishes Manual for Architectural Metal Products.
- H. International Code Council (IBC).
 - 1. IBC: International Building Code Building Code.

1.4 DEFINITIONS

- A. Activation device: Device that, when actuated, sends an electrical signal to the door operator to initiate the door operation.
- B. Monitored Safety Devices: A tested system that works in conjunction with the automatic door control that detects the presence of a person or an object within a zone where contact could occur and provides a signal to stop the movement of the door.
- C. AAADM: American Association of Automatic Door Manufacturers.
- D. Operating ambient Temperature Range: 5 Degrees F to plus 122 degrees F (minus 15 C to 50 degrees C).
- E. For automatic door terminology, refer to ANSI/BHMA A 156.19 for definitions of terms.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide automatic doors that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturers corresponding systems.
- B. Compliance:
 - 1. ICC/IBC International Building Code
 - 2. ANSI/BHMA A 156.19 American National Standard for Power Operated Doors Pedestrian Doors.
 - 3. UL 325 Listed
 - 4. NFPA 70 National Electrical Code.
 - 5. NFPA 101 Life Safety Code
 - 6. CUL Approved for use in Canada
 - 7. UL Listed Fire Door Operator with Automatic Closer
- C. Automatic Door equipment accommodates medium to heavy pedestrian traffic.
- D. Opening Force Requirements:
 - 1. Power-Operated swinging doors shall open with a manual force not to exceed 30 lbf (133N) to set the door in motion and 15 lbf to fully open the door with force applied at 1" (25mm) from the latched edge of the door. The required force to prevent a stopped door from opening or closing shall to exceed 15 lbf (67N) measured 1" (25mm) from the latch edge of the door at any point during the opening or closing.
- E. Closing Time:
 - 1. Door operators shall be field adjustable to close 90 degrees to 10 degrees in 3 seconds or longer per ANSI/BHMA A 156.19 standard.

2. Door shall be field adjusted to close from 10 degrees to fully closed position in not less than 1.5 seconds.

1.6 SUBMITTALS

- A. Comply with Division 01 – Submittal Procedures.
- B. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles fabrication, operational descriptions and finishes.
- C. Shop Drawings: For automatic entrances. Include plans, elevations, sections, details, hardware mounting heights, additional accessories and attachments to other work.
- D. Samples: color samples of exposed finish as required.
- E. Informational Submittals: Manufacturers product information and applicable sustainability program credits that are available towards a LEED rated product certification.
 1. Credit MR 4.1 and 4.2: Manufacture's or fabricator's certificate indicating percentage of post-consumer recycled content by weight and pre-consumer recycled content by weight for each product specified under this section.
- F. Manufacturers Field Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA A 156.19 after completion of installation.
- G. Operating and Maintenance Manuals: Provide manufacturers operating, owners and maintenance manuals for each item specified as required in Division 01, Closeout Submittals.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: 10 years minimum of documented experience in manufacturing door equipment similar to that indicated within this specification with a proven record of successful service performance. A manufacturer with company certificate issued by AAADM.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 5 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated in this specification and whose work has resulted in construction with a record of successful in-service performance. Manufacturer's authorized representative who is trained and approved for installation and maintenance of units by AAADM required for this Project
- C. Source Limitations for Automatic Operators: Obtain each type of automatic door operator and sensor components specified in this section from single source from single manufacturer.
- D. 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.
- E. Power-Operated Door Standard: ANSI/BHMA A 156.19 Current year.
- F. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrances serving as a required means of egress.

1.8 PROJECT CONDITIONS

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

1.9 COORDINATION

- A. Coordinate door operators 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.
- B. Electrical System Roughing-in: Coordinate layout and installation of automatic power door operator with connections to power supplies and access-control system.

1.10 WARRANTY

- A. Automatic Door Operators to be free of defects in material and workmanship for a period of One (1) year from the date of substantial completion.
- B. Safety Sensors to be free of defects in material and workmanship for a period of One (1) year from the date of substantial completion.
- C. During the warranty period a factory trained technician shall preform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form submitted to the owner.
- D. During the warranty period all warranty work shall be performed during normal working hours.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. dormakaba • Reamstown, PA • 1-844-SPEC-NOW (1-844-773-2669) • Website: www.dormakaba.us • Email: specnow@dorma.com
- B. Substitutions: Requests for substitution and product approval in compliance with the specification must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 AUTOMATIC SWING DOOR OPERATOR

- A. Model: DORMA, ED Series ED250 (Basis of Design) An Integrated, self-learning automatic swing door operator with an advanced CPU, a multistage gearbox with real time adaptive software and available user interface.
 - 1. Automatic Door Configuration:
 - a. Configuration: Single swing door or pair of doors swinging.
 - b. Traffic Pattern: two-way.
 - c. Mounting: Surface applied

- B. Control Features
 - 1. Power-hold Close
 - 2. Built in Lock Delay
 - 3. On-Off-Hold Open switch control to control door function, (Automatic-Hold Open- Exit Only)
 - 4. On-Off Power Switch
 - 5. Fire Alarm Integration
 - 6. Field Adjustable Handing
 - 7. Push and Go
 - 8. Power Assist Opening Activation
 - 9. Intergraded Connections for Monitored Safety Sensors and other accessories.
 - 10. Integrated access control
- C. Door Control Features
 - 1. Wind Load and Stack Pressure microprocessor monitored with power boost to ensure secure opening and closing in changing conditions.
 - 2. Door Weight Max. ED 250 320 lbs.
- D. Header Size: Fine header height at 2 3/4" by 5" 1/8" depth.

2.3 ACTIVATION DEVICES

- A. Activation Device:
 - 1. Touchless Wave Plate: 2-3/4 inch x 4-1/2 inch on exterior bollard, 4-1/2 inch square double gang vestibule activation sensor plates in black. Microwave technology has an adjustable range of 4 inches to 24 inches.

2.4 SAFETY DEVICES

- A. Provide door controls in accordance with ANSI/BHMA standards A 156.19 and complying with cited BHMA standard for condition of exposure and for long-term, maintenance-free operation under normal traffic load. When presence sensors are used, they shall be monitored in accordance with ANSI/BHMA A 156.10. Coordinate controls with door operation and door operators.
- B. Optional (Door Mounted Sensor System) DMS as specified:
 - 1. Door Mounted Presence Sensor (DMS): Door mounted infrared presence Sensor mounted on the approach or push side of the door. Each module within the sensor housing shall detect a 28" (50.8 cm) minimum high person. The sensor shall be mounted at the top rail of the door(s). System will reactivate a closing door.

2.5 ELECTRICAL

- A. Electrical 115 V AC +/- 10% 50/60 Hz 6.6 A max.

2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Anodized Finish:
 - 1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm.

EXECUTION

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames with Installer present, for compliance with requirements for installation tolerances, wall and floor construction and other conditions affecting performance of automatic entrances.
- B. Examine roughing in for electrical source power to verify actual locations of wiring connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.
- 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, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
- C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections.
- D. Sealants: Comply with requirements specified in Division 07 Section "Joint Sealants" to provide seal between the operator housing and wall surface. installation.
- E. Signage: Apply signage on both sides of each door and each sidelight as required by ANSI/BHMA A 156.19

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's representative shall provide technical assistance and guidance for installation of automatic doors.
 - 1. Factory trained and AAADM certified representative shall test and inspect each automatic door to determine compliance of the installed system to ANSI/BHMA A 156.19

3.4 ADJUSTING

- A. Adjust door operators and controls for smooth and safe operation.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by automatic operator installation promptly after installation .

3.6 DEMONSTRATION

- A. Engage a factory authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of automatic entrances.

END OF SECTION 08-7113

SECTION 08-8000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass products.
 - 2. Laminated glass.
- B. Related Requirements:
 - 1. Section 08-8300 "Mirrors."

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glazing Accessory Samples: For , in **12-inch** lengths. Install sealant Samples between two strips of material representative in color of adjoining framing system.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For .
- B. Product Certificates: For glass.

1.6 QUALITY ASSURANCE

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain tinted and coated glass from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC . Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.
 1. Minimum Glass Thickness for Exterior Lites: 1/4" .
 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Interlayer Color: Clear unless otherwise indicated.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
 - C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
 - D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
 - E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
 - F. Provide spacers for glass lites where length plus width is larger than **50 inches**.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide **1/8-inch-** minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
 - G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
 - H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
 - I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
 - J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
 - K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.
- 3.4 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 in writing 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 in writing by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.6 LAMINATED GLASS SCHEDULE

- A. Clear Laminated Glass Type : Two plies of fully tempered float glass.
 - 1. Minimum Thickness: ¼”

END OF SECTION 08-8000

SECTION 08-8300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silvered flat glass mirrors.

B. Related Requirements:

1. Section 08-8000 "Glazing" for glass with reflective coatings used for vision and spandrel lites.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of mirror and mirror mastic.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

D. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: Five years from date of Substantial Completion .

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- B. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C1503 ; manufactured using copper-free, low-lead mirror coating process.
- B. Annealed Monolithic Glass Mirrors: Mirror Select Quality, clear .
 - 1. Nominal Thickness: 5.0 mm .
 - 2. Tint Color: Blue .
- C. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear .
 - 1. Nominal Thickness: 5.0 mm .
 - 2. Tint Color: Blue .

- D. Laminated Mirrors: ASTM C1172, Type II.
1. Glass for Outer Lite: Annealed float glass, Mirror Select Quality, clear
 - a. Tint Color: Blue .
 2. Nominal Thickness for Outer Lite: 5.0 mm .
 3. Glass for Inner Lite: Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear) .
 4. Nominal Thickness: 5.0 mm .
 5. Interlayer: Mirror manufacturer's standard **0.030-inch-** thick, clear polyvinyl-butylal interlayer with a proven record of showing no tendency to delaminate from, or cause damage to, silver coating.
- E. Safety Glazing Products: For laminated mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
1. Aluminum J Channel Bottom and Side Trim: J-channels formed with front leg and back leg not less than **3/8 and 7/8 inch** in height, respectively, and a thickness of not less than **0.04 inch**.
 2. Aluminum J Channel Top Trim: J-channels formed with front leg and back leg not less than **5/8 and 1 inch** in height, respectively, and a thickness of not less than **0.04 inch**.
- B. Aluminum J-Channels and Cleat: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
1. Aluminum J Channel and Cleat, Bottom and Side Trim: J-channels formed with front leg and back leg not less than **5/16 and 3/4 inch** in height, respectively.
 2. Aluminum J Channel and Cleat, Top Trim: Formed with front leg with a height matching bottom trim and back leg designed to fit into the pocket created by wall-mounted aluminum cleat.
- C. Mirror Bottom Clips: As indicated .

- D. Mirror Top Clips: As indicated .
- E. Plated Steel Hardware: Formed-steel shapes with plated finish indicated.
 - 1. Profile: As indicated.
 - 2. Finish: .
- F. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- G. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

- A. Shop fabricate mirrors to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished .
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.
- D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. NGA Publications: "Laminated Glazing Reference Manual," "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Provide a minimum airspace of **1/8 inch** between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks **1/8 inch** thick by **4 inches** long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than **1/4 inch** wide by **3/8 inch** long at bottom channel.
 - 2. Aluminum J-Channels and Cleat: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.
 - 3. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips where indicated .
 - 4. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. 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.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of **1/8 inch** between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 08-8300

SECTION 09-2216 – NON-LOAD BEARING STEEL FRAMING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior framing systems (e.g., interior non-bearing partition walls and support framing, framed soffits, furring, etc.).
- B. Related Sections include the following:
 - 1. Division 5 Section "Cold-Formed Metal Framing".
 - 2. Division 7 Section "Building Insulation".
 - 3. Division 7 Section "Firestopping".
 - 4. Division 7 Section "Joint Sealants".
 - 5. Division 9 Section "Gypsum Board".

1.3 SUBMITTALS

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

1.4 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. 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.

PART 2 – PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
 2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized, unless otherwise indicated.

2.2 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.0269 (22 ga.)
 2. Depth: As indicated on Drawings.
- B. Slip-Type Head Joints: Provide one of the following:
1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
 - b. Metal-Lite, Inc.; The System.

- c. Or equal.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Minimum Base-Metal Thickness: 0.0269 (22 ga.)
- E. Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: As required by code or design specifications.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches , 0.068-inch-thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base Metal Thickness: 0.0179.
 - 2. Depth: As indicated on Drawings.
- G. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped.
- H. Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: As indicated on Drawings.
 - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch .
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- I. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches , wall attachment flange of 7/8 inch , minimum bare-metal thickness of 0.0179 inch , and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

- C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
 - 1. Depth: 1-1/2 inches (unless otherwise indicated on Drawings).
- E. Furring Channels (Furring Members):
 - 1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base Metal Thickness: 0.0179 inch.
- F. Grid suspension systems are suitable for use with gypsum board. They might not be acceptable for gypsum veneer plaster; consult gypsum veneer plaster and grid suspension system manufacturers before specifying them.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. 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 studs so flanges within framing system point in same direction.
1. Space studs as follows:
 - a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
 - b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
 - c. Tile backing panels: 16 inches o.c., unless otherwise indicated.
- C. 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 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.
 - d. All door and window opening framing to have 2x wood frame for attachment.
 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.
- D. 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 o.c.

E. Z-Furring Members:

1. Erect insulation (specified in Division 7 Section "Building Insulation") vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLATION OF SUSPENSION SYSTEM

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes

END OF SECTION 09-2216

SECTION 09-2900 – GYPSUM BOARD

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Interior gypsum board.
- 2. Tile backing panels.

B. Related Requirements:

- 1. Section 06-1600 "Sheathing" for gypsum sheathing for exterior walls.
- 2. Section 09-3000 "Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written 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.

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. USG, National Gypsum, Certainteed
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M. All spaces except where noted below.
 - 1. Thickness: **5/8 inch** .
- C. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 1, public lobby and public meeting room.
 - 1. Core: **5/8 inch** , Type X.
 - 2. Long Edges: Tapered.

3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

- A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
 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. USG, National Gypsum, Certainteed
 2. Core: **5/8 inch**, Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
 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. USG, National Gypsum, Certainteed
 2. Thickness: **5/8 inch**.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Reveal joints as per drawings and details.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
 - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, 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** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Type X: Where required for fire-resistance-rated assembly.
 2. Abuse-Resistant Type: Where noted in this specification. Soffits and headers may be minimum 1/2" regular type drywall.
 3. Glass-Mat Interior Type: All areas to receive tile.
- 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 panel 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. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 2: Panels that are substrate for tile.
 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

- a. Primer and its application to surfaces are specified in Section 09-9123 "Interior Painting."
 - 3. Level 5: Rooms 102.
 - a. Primer and its application to surfaces are specified in Section 09-9123 "Interior Painting."
 - E. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- 3.7 PROTECTION
- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
 - B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
 - C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09-2900

SECTION 09-3100 – CERAMIC TILE

PART 1 – GENERAL

1.01 STIPULATIONS

- A. The specifications sections “General Conditions”, “Special Requirements” and “General Requirements” form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Glazed wall tile.
 - 2. Unglazed wall tile
 - 3. Unglazed floor tile
 - 4. Stone thresholds installed as part of tile installations.
 - 5. Accessories
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
 - 2. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 3. Division 9 Section "Gypsum Board Assemblies" for cementitious backer units installed in gypsum wallboard assemblies.

1.03 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.04 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.
- B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing

assemblies according to ASTM C 627 that are representative of those indicated for this Project:

1. Heavy: Passes cycles 1 through 12.

1.05 SUBMITTALS

- A. Product Data: For each type of tile, mortar, grout, and other products specified.
- B. Shop Drawings: For the following:
 1. Tile patterns and locations.
 2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
 1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Professional.
 2. Full-size units of each type of trim and accessory for each color required.
 3. Stone thresholds in 6-inch lengths.
 4. Metal edge strips in 6-inch lengths.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of Professionals and Users, and other information specified.

1.06 QUALITY CONTROL

- A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:

1. Stone thresholds.
2. Cementitious backer units.
3. Joint sealants.
4. Waterproofing.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

PART 2 – PRODUCTS

2.01 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:
 1. Tile Products:
 - a. Dal-Tile Corporation.
 - b. Crossville.
 - c. American Olean Tile Company.
 - d. Or as specifically noted on the finish schedule
 2. Tile-Setting and -Grouting Materials:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 - c. Mapei Corp.

2.02 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.
- C. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

2.03 TILE PRODUCTS

- A. General: Refer to schedule at the end of this Section.
- B. Unglazed Paver Tile: Provide flat tile complying with the following requirements:
1. Composition: Porcelain.
 2. Facial Dimensions: As Noted on the Finish Schedule Key.
 3. Thickness: As Noted on the Finish Schedule Key.
 4. Face: Pattern of design indicated, with square or cushion edges.
- C. Glazed Wall Tile: Provide flat tile complying with the following requirements:
1. Module Size: As Noted on the Finish Schedule Key.
 2. Thickness: As Noted on the Finish Schedule Key.
 3. Face: Plain with modified square edges or cushion edges.
 4. Mounting: Factory back-mounted.
- D. Unglazed Wall Tile: Provide flat tile complying with the following requirements:
1. Module Size: As Noted on the Finish Schedule Key.
 2. Thickness: As Noted on the Finish Schedule Key.
 3. Face: Plain with modified square edges or cushion edges.
 4. Mounting: Factory back-mounted.
- E. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 2. Shapes: As follows, selected from manufacturer's standard shapes:
 - a. Base for Thin-Set Mortar Installations: Cove.
 - b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
 - c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
 - d. Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.

- e. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.
- F. Metal Trim: Provide Schluter trim pieces as indicated on plans, details and schedules. Provide Schluter RENO-U Ramp transition under doors. Provide Schluter RONDEC at all outside corners unless noted otherwise.

2.05 SETTING MATERIALS

- A. Dry-Set Portland Cement Mortar: ANSI A118.1.
 - 1. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
Dry-Set
- B. Modified Dry-Set Cement Mortar: ANSI 118.4
 - 1. For wall applications, provide nonsagging, latex-portland cement mortar, and or Medium Bed Thin-Set mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
Dry-Set
- C. Improved Modified Dry-Set Cement Mortar: ANSI 118.15
 - 1. For wall and floor applications, provide nonsagging, latex-portland cement mortar, and or Medium Bed Thin-Set mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2
 - 2. Mortar Bed Materials:
 - 1. Portland cement: ASTM C150, type 1, gray or white.
 - 2. Hydrated Lime: ASTM C207, Type S.
 - 3. Sand: ASTM C144, fine.
 - 4. Latex additive: As approved.
 - 5. Water: Clean and potable.

2.06 GROUTING MATERIALS

- A. Standard Cement Grouts: ANSI 118.6 composed of white or gray cement and white or colored aggregate as required to produce color indicated by one of the following grout manufacturers:
 - 1. Custom Building Products; PolyBlend Grouts.
 - 2. Laticrete International; 1500/1600 Series Grouts.
 - 3. Mapei Corp; Keracolor Grouts.
- B. High Performance Cement Grouts: ANSI 118.7

Factory prepared mixture of cement and other ingredients, including redispersible, latex/polymer to which water only is added at job site, or liquid latex admixture.

1. Custom Building Products; Prism Sure Color Grouts.
2. Laticrete International; Permacolor Grouts.
3. Mapei Corp; Ultracolor Plus.

2.07 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.
- D. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. One-Part, Mildew-Resistant Silicone Sealants:
 - a. Dow Corning 786; Dow Corning Corporation.
 - b. Sanitary 1700; GE Silicones.
 - c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
 - d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
 - e. Tremsil 600 White; Tremco, Inc.
 - f. Custom Building Products: 100 Silicone Caulk.

2.08 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: White-zinc-alloy terrazzo strips, 1/8 inch wide at top edge with integral provision for anchorage to mortar bed or substrate. Provide at all flooring material transitions unless otherwise indicated.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.09 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 – EXECUTION

3.01 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 from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and HVAC units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Professional.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
 - 1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.03 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of latest revised (2013) ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCNA Installation Guidelines: TCNA's "Handbook for Ceramic Tile Installation." Comply with latest 2014/2015 TCNA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. 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.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile per latest TCNA EJ-171. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- H. Grout tile to comply with the requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.
- I. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.04 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.
- C. Waterproof all floors to receive ceramic tile.

3.05 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Finish Key Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
- B. Joint Widths: Install tile on floors with the following joint widths:
 - 1. Quarry Tile: 1/8 inch.
 - 2. Paver Tile: 1/8 inch.
 - 3. Large Format Paver Tile: 3/16 inch
- C. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - 1. Tile floors in wet areas.
 - 2. Tile floors installed with chemical-resistant mortars and grouts.
 - 3. Tile floors composed of tiles 8 by 8 inches or larger.
 - 4. Tile floors composed of rib-backed tiles.
- D. Medium Bed Mortar Method: For installations indicated, obtain 80% or 95% wet percent mortar coverage by complying with applicable special requirements for medium bed mortar method of tile in referenced ANSI A108 series of tile installation standards:
 - 1. Large format tile with demsional length of 15" or greater. (ANSI 108.02 4.3)
 - 2. Floor tiles with greater than normal dimensional thickness.
- E. Stone Thresholds: Install stone thresholds at required locations; set in same type of setting bed as abutting field tile, unless otherwise indicated.
 - 1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
- F. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.06 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Finish Key Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
 - 1. Wall Tile: 1/16 inch.
- C. Back Buttering: For installations indicated, obtain 95 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - 1. Tile wall installations in wet areas, including showers, tub enclosures, laundries, and swimming pools.
 - 2. Tile installed with chemical-resistant mortars and grouts.

3.07 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 - 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09-5123 – 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Ceilings consisting of acoustical tiles and suspension systems.
 - 2. Edge moldings.

1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Product Test Reports: Indicate compliance of acoustical tile ceilings and components with requirements based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical tile ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling tile from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
 - 1. Obtain both acoustical ceiling tiles and suspension system from the same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, 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.

1.6 PROJECT 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.

1.7 COORDINATION

- A. Coordinate layout and installation of acoustical tiles and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent of amount installed.
 - 2. Suspension System Components: Quantity of each grid and exposed component equal to 2.0 percent of amount installed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. BPB USA,
 - 3. USG Interiors, Inc,

2.2 ACOUSTICAL TILES, GENERAL

- A. 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 Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.
- B. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.
- C. Antimicrobial Treatment: Provide acoustical tiles treated with manufacturer's standard antimicrobial solution consisting of a synergistic blend of substituted ammonium salts of alkylated phosphoric acids admixed with free alkylated phosphoric acid that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.
- D. Tile Characteristics: Comply with requirements indicated in the Finish Key Schedule located on Construction Drawings, including those referencing ASTM E 1264 classifications.

2.3 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 ASTM C 635 requirements.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 1. Postinstalled Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. 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, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

- E. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical tile edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.4 EDGE MOLDING

- A. 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 product designations, including splice plates, corner pieces, and attachment and other clips, complying with the following requirements:
 - 1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong World Industries, Inc.
 - b. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
 - c. USG Interiors, Inc.

2.5 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and the following requirements:
 - 1. Product is 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.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. PL Acoustical Sealant; ChemRex, Inc., Contech Brands.
 - b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
 - c. SHEETROCK Acoustical Sealant; United States Gypsum Co.
 - 2. Acoustical Sealant for Concealed Joints:
 - a. BA-98; Pecora Corp.

- b. Tremco Acoustical Sealant; Tremco, Inc.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing 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 other conditions affecting performance of acoustical tile ceilings.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for preset inserts, clips and other ceiling anchors whose installation is specified in other sections.
- 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 units at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical tile ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
 2. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings-- Seismic Zones 0-2."
 3. U.B.C.'s "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings": U.B.C. Standard 25-2.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. 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.
 4. 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. Size

- supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
5. 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; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. 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 structure to which hangers are attached and 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.
 7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.
- 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 units.
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 o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 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.
- 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 o.c.
 3. Fabricate access units for special suspension system access members and tile units modified as required to allow for removal of access units.

4. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09-5123

SECTION 09-6513 - 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.
 - 2. Resilient stair accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 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. Coordinate mockups in this Section 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 or more than 90 deg F .

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 – PRODUCTS

2.1 THERMOPLASTIC–RUBBER BASE

- A. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Basis of Design: Roppe
 - 2. Johnsonite is an acceptable alternate.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location:
 - a. Style B, Cove: .
- C. Thickness: 0.125 inch.

- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: as per finish schedule.

2.2 RUBBER STAIR ACCESSORIES

- 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. **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. Basis of Design: Roppe
 - 2. Johnsonite is an acceptable alternate.
- C. Stair Treads: ASTM F 2169.
 - 1. Type: TS (rubber, vulcanized thermoset).
 - 2. Class: 2 (pattern; embossed, grooved, or ribbed).
 - 3. Group: 2 (with contrasting color for the visually impaired).
 - 4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 - 5. Nosing Height: as per details.
 - 6. Thickness: 1/4 inch and tapered to back edge.
 - 7. Size: Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.
- D. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- E. Locations: as per finish schedule.
- F. Colors and Patterns: as per finish schedule.

- G. Provide rubber stringer at stairs and bleachers in manufacturer's standard color selected by Architect.

2.3 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces 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. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.

4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 5. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Tightly adhere to substrates throughout length of each piece.
2. For treads installed as separate, equal-length units, install to produce a flush joint between units.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09-6513

SECTION 09-6519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile.
 - 2. Vinyl composition floor tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE

- A. Basis of Design Manufacturer: see finish schedule
- B. Tile Standard: ASTM F 1700.
 - 1. Class: As indicated by product designations.
 - 2. Type: B, Embossed Surface.
- C. Size: as indicated on finish schedule
- D. Colors and Patterns: as indicated on finish schedule

2.3 VINYL COMPOSITION FLOOR TILE

- A. Basis of Design Manufacturer: see finish schedule
- B. Tile Standard: ASTM F 1066, Class 3, surface pattern.
- C. Thickness: as indicated by manufacturer's designations

- D. Size: as per finish schedule.
- E. Colors and Patterns: as per finish schedule

2.4 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
 - 2. Contractor to fill or repair existing substrates to meet the manufacturer's requirements at no additional cost to the project.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
 - 4. Moisture Testing: Perform testing as required by the manufacturer.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates meet manufacturer's requirements.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates meet manufacturer's requirements.
- C. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles as indicated in floor plans or as directed by Architect

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles as indicated in floor plans or as directed by Architect

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Resilient Terrazzo Accessories: Install according to manufacturer's written instructions.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 09-6519

SECTION 09-6813 - CARPET TILE

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 carpet tile and installation.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 3 Sections for curing compounds and other concrete treatments compatibility with carpet tile and adhesives.
 - 2. Division 9 Section "Resilient Wall Base and Accessories" for materials and installation.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of carpet tile material and installation accessory specified. Submit manufacturer's printed data on physical characteristics, durability, fade resistance, dye method, and fire-test-response characteristics. Submit methods of installation for each type of substrate.
- C. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work. Label each sample with the manufacturer's name, material type, color, pattern, and designation indicated on Drawings and carpet tile schedule. Submit the following:
 - 1. Full-size sample of each type of carpet tile required.
 - 2. 12-inch Samples of each type of exposed edge stripping and accessory item.
- D. Maintenance data for carpet tile to include in the operation and maintenance manual specified in Division 1. Include the following:
 - 1. Methods for maintaining carpet tile, including manufacturer's recommended frequency for maintaining carpet tile.
 - 2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance. Include cleaning and stain-removal products and procedures.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced Installer who is certified by the Floor Covering Installation Board (FCIB) or who can demonstrate compliance with FCIB certification program requirements.
- B. **Single-Source Responsibility:** Obtain each type of carpet tile from one source and by a single manufacturer.
- C. **Fire-Test-Response Characteristics:** Provide carpet tile with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet tile with appropriate markings of applicable testing and inspecting agency.
 - 1. **Surface Flammability:** Passes CPSC 16 CFR, Part 1630.
 - 2. **Critical Radiant Flux Classification:** Class I, not less than 0.45 W/sq. cm per ASTM E 648.
 - 3. **Flame Spread:** 25 or less per ASTM E 84.
 - 4. **Smoke Developed:** 450 or less per ASTM E 84.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. **General:** Comply with the Carpet and Rug Institute's CRI 104, Section 5: "Storage and Handling."
- B. **Deliver materials to Project site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.**
- C. **Store materials on-site in original undamaged packages, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, with continuous blocking off ground.**

1.6 PROJECT CONDITIONS

- A. **General:** Comply with CRI 104, Section 6: "Site Conditions."
- B. **Space Enclosure and Environmental Limitations:** Do not install carpet tile until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
- C. **Subfloor Moisture Conditions:** Moisture emission rate of not more than **3 lb/1000 sq. ft./24 hours** when tested by calcium chloride moisture test in compliance with CRI 104, 6.2.1, with subfloor temperatures not less than **55 deg F**.
- D. **Subfloor Alkalinity Conditions:** A pH range of 5 to 9 when subfloor is wetted with potable water and pHdriion paper is applied.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Carpet Tile Warranty: Submit a written warranty executed by carpet tile manufacturer and Installer agreeing to repair or replace carpet tile that does not meet requirements or that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, tile curling, snags, runs, and delamination.
- C. Warranty Period: 5 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Carpet Tile: Before installation begins, furnish quantity of full-size units equal to 5 percent of amount installed.

PART 2 – PRODUCTS

2.1 CARPET TILE

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the products specified in Finish Key Schedule located in Construction Drawings.

2.2 INSTALLATION ACCESSORIES

- A. Concrete-Slab Primer: Nonstaining type as recommended by carpet tile manufacturer.
- B. Trowelable Underlayments and Patching Compounds: As recommended by carpet tile manufacturer.
- C. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated and to comply with flammability requirements for installed carpet tile as recommended by carpet tile manufacturer.
 - 1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine subfloors and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting performance of carpet tile. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify that subfloors and conditions are satisfactory for carpet tile installation and comply with requirements specified in this Section and those of carpet tile manufacturer.
- C. In existing floor areas Contractor is responsible to patch or repair the substrate to meet the manufacturer's requirements at no additional cost to the project.

3.2 PREPARATION

- A. General: Comply with carpet tile manufacturer's installation recommendations to prepare substrates indicated to receive carpet tile installation.
- B. Level subfloor within **1/4 inch in 10 feet**, noncumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions.
 - 1. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by carpet tile manufacturer.
- C. Remove subfloor coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.
- D. Broom or vacuum clean subfloors to be covered with carpet tile. Following cleaning, examine subfloors for moisture, alkaline salts, carbonation, or dust.
- E. Concrete-Subfloor Preparation: Apply concrete-slab primer, according to manufacturer's directions, where recommended by carpet tile manufacturer.
- F. Resilient-Flooring Substrate Preparation: Replace missing pieces of existing resilient flooring or patch to level. Cut out peaked seams and fill with latex underlayment as recommended by manufacturer. Repair depressions with material recommended by carpet tile manufacturer.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 13: "Carpet Modules (Tiles)."
- B. Where demountable partitions or other items are indicated for installation on top of finished carpet tile floor, install carpet tile before installation of these items.
- C. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- D. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- E. Install borders parallel to walls.

3.4 CLEANING

- A. Perform the following operations immediately after completing installation:
 - 1. Remove visible adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove protruding yarns from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.

3.5 PROTECTION

- A. General: Comply with CRI 104, Section 15: "Protection of Indoor Installation."
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure carpet tile is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 09-6813

SECTION 09-9123 – INTERIOR PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Steel.
 - 3. Galvanized metal.
 - 4. Gypsum board.
- B. Related Requirements:
 - 1. Section 05-1200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.

- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) 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. VOC content.

1.5 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location 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. (Such as Sherwin Williams "Custodian" Project Color and Product Information manual.)

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.7 QUALITY ASSURANCE

- A. Mockups: Apply mockups 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. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
 1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.
 7. Application instructions.

- B. 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 (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) 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 Company products indicated or comparable product from one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Glidden Professional,
 - 3. Pratt & Lambert.
- B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
 - 1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

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. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Dry-Fog Coatings: 400 g/L.
 4. Primers, Sealers, and Undercoaters: 200 g/L.
 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 7. Pretreatment Wash Primers: 420 g/L.
 8. Floor Coatings: 100 g/L.
 9. Shellacs, Clear: 730 g/L.
 10. Shellacs, Pigmented: 550 g/L.
- C. Low-Emitting Materials: Interior paints and coatings 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. Colors: As indicated in a color schedule.
- 2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Gypsum Board: 12 percent.
 - e. Plaster: 12 percent.
 2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
 3. Plaster Substrates: Verify that plaster is fully cured.
 4. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. 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. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
 1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. 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.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. 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.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Tanks that do not have factory-applied final finishes.
 2. Paint the following work where exposed in occupied spaces:

- a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Sprinkler piping
 - i. Return grilles in walls are to be painted to match the wall color
 - j. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Semi-gloss
Filler: PrepRite Block Filler
2 finish coats: ProIndustrial Pre-Catalyzed Water-Based Epoxy, semi-gloss

B. Metal Substrates (Aluminum, Steel, Galvanized Steel) Doors, Frames, Stair components and miscellaneous metals including elevator frames and doors

1. WaterBased Alkyd Urethane to meet ASTM D3363 Pencil Hardness of 5H
Primer: ProIndustrial Pro-Cryl Universal Primer
2 finish coats: ProIndustrial WB Alkyd Urethane Enamel, B53 series, semi-gloss

C. Gypsum and Plaster Substrates:

1. Ceilings and soffits- flat finish
Primer: ProMar Ceiling Paint flat
2 finish coats: ProMar Ceiling Paint flat
2. Eggshell finish
Primer: ProMar 200 Zero VOC Primer
2 finish coats: ProIndustrial Pre-Catalyzed Water-Based Epoxy

3.7 EXTERIOR PAINTING SCHEDULE

A. Metal Substrates (ferrous and galvanized):

1. Semi-gloss
Primer: ProIndustrial Pro-Cryl Universal Primer
2 finish coats: Sher-Cryl HPA, semi-gloss (no substitutions)

B. Existing Metal Roof

- Primer: SW BondPlex
2 coats: SW Sher-Cryl High Performance Acrylic, semigloss.

END OF SECTION 09-9123

SECTION 10-2116 - HDPE TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments including the following: (Hiny Hiders)
 - 1. Floor mounted overhead-braced toilet compartments.
 - 2. Privacy screens.
 - 3. Shower and dressing compartments.

1.2 RELATED SECTIONS

- A. Section 05-1200 - Metal Fabrications: Structural support ceiling beam for ceiling hung partitions provided as Work of Section 05-1200; Unistrut channels not acceptable.
- B. Section 06-1053 - Rough Carpentry: Anchorage/blocking for attachment of partitions.

1.3 REFERENCES

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01-3300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 4. Preparation instructions and recommendations.
 - 5. Storage and handling requirements and recommendations.
 - 6. Installation methods.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.
 - C. Materials: Doors, panels and pilasters shall be constructed from High Density Polyethylene (HDPE) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.
 - D. Performance Requirements:
 - 1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
 - a. Class A flame spread/smoke developed rating, tested to ASTM E84.
 - 2. Material Fire Ratings:
 - b. National Fire Protection Association (NFPA) 286: Pass.
 - c. International Code Council (ICC): Class B.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
- 1.7 PROJECT CONDITIONS
- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- 1.8 WARRANTY
- A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. (Labor not included in warranty.)

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Scranton Products, which is located at: 801 E. Corey St. ; Scranton, PA 18507; Toll Free Tel: 800-445-5148; Email: [request info \(info@scrantonproducts.com\)](mailto:info@scrantonproducts.com); Web: www.scrantonproducts.com
 - 1. Fabricator: Santana Toilet Partitions.
- B Substitutions: as per section 01-2500.

2.2 MATERIAL

- A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface;
- B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.
- C. Stainless Steel Castings: ASTM A167, Type 304.

- D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

- A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
1. Style: Floor mounted overhead-braced toilet compartments.
- B. Doors, panels, and pilasters shall be 1 inch (25 mm) thick with all edges rounded to a radius. Doors and dividing panels shall be mounted based on height of specified system.
1. Door and Panel Height: 55 inches standard (1397 mm) (standard).
 2. Door Design: Standard.
 3. Door & Pilaster Edge: Standard.
 4. Pilaster shoes shall be 3 inches (76 mm) high stainless steel (type 304, 20 gauge) secured to the pilaster with a stainless steel tamper resistant Torx head sex bolt.
- C. Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design. The headrail shall have a clear anodized finish and shall be fastened to the headrail bracket by a stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
Headrail brackets shall be 20 gauge stainless steel with a satin finish and secured to the wall with a stainless steel tamper resistant Torx head screws.
- D. Wall Brackets:
1. Stainless Steel Brackets: Wall brackets shall be made of stainless steel type 304.
 2. The brackets are fastened to the pilaster with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
 3. Bracket Type: Stirrup stainless steel double ear.
 4. Bracket Type: Stirrup stainless steel single ear.
 5. Bracket Type: Continuous 54 inches (1372 mm) stainless steel.
- E. Door Hardware:
1. Hinges: 54 inches (1372 mm) continuous stainless steel spring loaded.
 2. Door strike/keeper shall be made of heavy-duty extruded aluminum (6436-T5 alloy) with a bright dip anodized finish and secured to the pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - a. Style: 6 inches (152 mm) aluminum
 3. Stainless Steel Slide Bolt Latch and housing shall be made of heavy-duty stainless steel type 304. The latch housing shall have a bright finish, and the slide bolt and button shall have a black anodized finish.
 4. Each door shall be supplied with one coat hook/bumper and door pull made of chrome plated Zamak.
 5. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

- A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.
- B. Panels, and pilasters, if required, shall be 1 inch (25 mm) thick with all edges rounded to a radius. Screens shall be mounted at 14 inches (356 mm) above the finished floor. Color as selected by Architect from manufacturer's full line of current colors.
- C. Type: Wall mounted screen.
 - 1. Screen: Urinal screens shall be 18 inches (457 mm) wide by 42 inches (1067 mm) high.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.
- C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).
- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

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

END OF SECTION

SECTION 10-2215 – FIXED GLASS PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fixed, frameless glass panel partitions with sliding glass doors.
- B. Related Requirements: Related project requirements can be found in the following documents:
 - 1. Section 05-5000 "Metal Fabrications" for overhead supports that attach glass panel partition tracks to structure.

1.2 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association (AAMA): www.aama.org:
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum
- B. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI): www.asce.org:
 - 1. ASCE/SEI 7 Minimum Design Loads for Buildings and Other Structure
- C. ASTM International (ASTM): www.astm.org:
 - 1. ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
 - 2. ASTM B221/ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - 3. ASTM C1048 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
 - 4. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass
 - 5. ASTM E90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - 6. ASTM E413 Classification for Rating Sound Insulation
 - 7. ASTM E557 Guide for the Installation of Operable Partitions
- D. Builders Hardware Manufacturers Association (BHMA): www.buildershardware.com:
 - 1. ANSI/BHMA A156 Series
- E. Code of Federal Regulations
 - 1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials
- F. International Code Council (ICC): www.iccsafe.org:
 - 1. ICC A117.1 Accessible and Usable Buildings and Facilities (ANSI)
- G. U.S. Architectural & Transportation Barriers Compliance Board: www.access-board.gov:
 - 1. Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate installation of glass panel partitions with installation of floor, wall, and ceiling construction to comply with substrate tolerance requirements of partition manufacturer.
2. Coordinate installation of anchors and secondary structural members indicated on approved glass panel partition shop drawings and specified in other sections.

B. Preinstallation Conference: Conduct conference at Project Site.

1.4 ACTION SUBMITTALS

A. Product Data: For each glass panel partition and door component specified, including:

1. Glass panels.
2. Frame and sill tracks.
3. Door hardware and accessories.

B. Shop Drawings: For fixed glass panel partitions.

1. Include plans, elevations, sections, and details. Provide numbered panel installation sequence.
2. Show locations and requirements for tracks, bracing, blocking, and attachments to other work.

C. Samples for Verification: For each exposed component including hardware, for each color and finish selected, of size indicated below:

1. Glass: Units 12 inches (300 mm) square.
2. Exposed Frame, Track, and Sill Members: Not less than 6 inches (150 mm) long.
3. Hardware: One of each type of exposed door hardware items.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified installer.

B. Warranty: Sample of unexecuted manufacturer warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Experienced Installer equipped and trained for installation of glass panel partitions required for this Project with record of successful completion of not less than five projects of similar scope.

B. Single Source Responsibility: Provide glass panel partitions and associated hardware by a single manufacturer through a single source.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Standard form in which manufacturer agrees to repair or replace components of glass panel partitions that demonstrate deterioration or faulty operation due to defects in materials or workmanship under normal use within warranty period specified.

1. Warranty Period: Five years date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Provide **PURE Frameless** glass panel partitions with sliding glass doors, manufactured by DORMA USA, Inc.; (800) 523-8483; email: specification@dorma-usa.com; website: www.dorma.com, or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide glass panel partition tested by qualified testing agency as follows:
 1. Sound-Transmission Requirements: Tested for laboratory sound-transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than STC indicated.

2.3 GLASS PANEL PARTITIONS

- A. Fixed Glass Panel Partitions: Frameless glass panel partition with top track and bottom sill guide, with butt-glazed dry joint between panels, and equipped with sliding doors where indicated.
 1. Basis of Design: **DORMA, PURE.**
 2. Sound Transmission Class (STC), ASTM E 90 and Outdoor-Indoor Transmission Class (OITC), ASTM E1332:
 - a. Framed partition with 12.0 mm thick laminated glass: STC 33; OITC 30.
 - b. Sliding door with 12.0 mm thick laminated glass: STC 15; OITC 15.
 3. Partition Top Track: Aluminum extrusion, low-profile.
 4. Sill Guide: Aluminum extrusion.

2.4 GLASS PANELS AND DOORS

- A. Glass Panels, General: Provide glass panels that comply with 16 CFR 1201, Category II requirements for safety glazing. Permanently mark glazing with certification label of the SGCC.
 1. Glass and Door Panel Thickness: Thickness required for size of panel based upon manufacturer's written recommendations, but not less than 12 mm.
- B. Fully Tempered Clear Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; thickness 16.0 mm.

2.5 SLIDING DOORS

- A. Accessibility Standard: Comply with applicable provisions in ADA-ABA Accessibility Guidelines for Buildings and Facilities] [and] [ICC A117.1] [requirements of authorities having jurisdiction].
- B. Doors: Glass panel matching partition panel material and thickness, of size indicated on Drawings.

- C. Sliding Door Track: Extruded aluminum track designed for operation, size, and weight of glass panel door, with factory-finished head closure trim and seals as required for acoustical performance indicated.
- D. Track Mounting:
 - 1. Ceiling recess-mounted.
- E. Door Panel Carriers: Trolley system designed for operation, size, and weight of glass panel door, with ball-bearing wheels.
- F. Manual Sliding Door Operation:
 - 1. Single door with regulated sliding and cushioned close.
 - a. Basis of Design: DORMA PURE with SoftClose.

2.6 MATERIALS

- A. Aluminum: ASTM B221 (ASTM B221M), with strength and durability characteristics of not less than Alloy 6063-T5.
- B. Stainless Steel: ASTM A666, Type 304.

2.7 FINISHES

- A. Aluminum Finish:
 - 1. Clear anodic finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
- B. Stainless Steel Finishes: No. 4 directional satin finish.

2.8 DOOR HARDWARE AND FITTINGS

- A. Door Hardware, General: All-glass door hardware units in types, sizes, quantities, and mounting locations recommended by manufacturer for glass door types, sizes, and operation. For exposed components, match metal and finish of exposed partition fittings unless otherwise noted.
- B. Pulls and Handles: Back-to-back, minimum 1-3/8 inch diameter.
 - 1. Design: As selected by Architect from manufacturer's standard designs.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine partition substrates to determine if work is within glass panel partition manufacturer's required tolerances and ready to receive work. Proceed with installation of partitions once conditions affecting installation and performance of partitions meet manufacturer's requirements.
- B. Verify that partition construction adjacent to acoustically-rated glass panel partitions complies with requirements of ASTM E557.

3.2 PARTITION INSTALLATION

- A. General: Comply with glass panel partition manufacturer's written installation instructions and approved shop drawings.
- B. Install glass panel partitions after other finishing operations have been completed.
- C. Set units level, plumb, and true to line, with uniform joints.
- D. Fasten glass panel partition track and sill to building structure and supports as indicated on approved shop drawings, utilizing approved fasteners and spacing.
- E. Set, seal, and grout floor closer cases.

3.3 ADJUSTING

- A. Adjust door closers to required timing and force.
- B. Adjust latches and locks for smooth operation.
- C. Test and adjust hardware linked to access control system.
- D. Replace damaged panels and accessories.

3.4 CLEANING

- A. Clean glass panels in accordance with glass manufacturer's written instructions. Do not use cleaning agents or methods not approved by glass manufacturer.
- B. Clean exposed metal surfaces to factory new appearance.

END OF SECTION

SECTION 10-2800 – TOILET AND BATH 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.

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. 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.

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.

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. Available 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. Bobrick Washroom Equipment, Inc..

- b. A & J Washroom Accessories, Inc.
- c. American Specialties, Inc.
- d. Bradley Corporation.
- e. McKinney/Parker Washroom Accessories Corp.

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. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.
- D. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- E. 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.
- F. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- G. 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. 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.
- B. 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 and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

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. Refer to Schedule located on Construction Drawings.

END OF SECTION 10-2800

SECTION 10-7500 – FLAGPOLES

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 ground-mounted flagpoles made from aluminum.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to the following design criteria:
 - 1. Wind Loads: 90 MPH according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."
 - 2. Base flagpole design on 5' x 8' polyester, nylon or cotton flags for use with flagpole.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.
- B. Shop Drawings: For flagpoles. Include plans, elevations, details, and attachments to other work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
 - 1. Include section, and details of foundation system for ground-mounted flagpoles.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain flagpole as complete unit, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 – PRODUCTS

2.1 FLAGPOLES

- A. Flagpole Construction, General: Construct flagpoles in one piece. Pole-Tech and **Flagpole Warehouse** are approved manufactures.
- B. Exposed Height: 25 feet.
- C. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch . Clear anodized finish.
- D. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, not less than 0.064-inch-nominal wall thickness. Provide with 3/16-inch steel bottom plate and support plate; 3/4-inch-diameter, steel ground spike; and steel centering wedges welded together. Galvanize steel after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.
 - 1. Provide flashing collar of same material and finish as flagpole.
 - 2. Provide steel ground protectors extending 12 inches aboveground and 6 inches belowground for steel flagpoles where flashing collars are not provided.

2.2 FITTINGS

- A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.
 - 1. 0.063-inch spun aluminum, finished to match flagpole.

- B. External Halyard: Ball-bearing, nonfouling, revolving truck assembly of cast metal with continuous 5/16-inch-diameter, braided polypropylene halyard and 9-inch cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.
 - 1. Provide one halyard and one cleat at each flagpole.
 - 2. Provide cast-metal cleat covers, finished to match flagpole, secured with cylinder locks.
 - 3. Provide halyard covers consisting of a 2-inch channel, 60 inches long, finished to match flagpole.
 - 4. Halyard Flag Snaps: Provide two stainless-steel swivel snap hooks per halyard.
 - a. Provide with neoprene or vinyl covers.
 - 5. Plastic Halyard Flag Clips: Made from injection-molded, UV-stabilized, acetal resin (Delrin). Clips attach to flag and have two eyes for inserting both runs of halyards. Provide two flag clips per halyard.
 - a. Product: Subject to compliance with requirements, provide "Quiet Halyard" flag clasp by Lingo.
 - 6. Provide one manufacturer's standard 5' x 8' American flag.

2.3 MISCELLANEOUS MATERIALS

- A. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.
- B. Sand: ASTM C 33, fine aggregate.
- C. Elastomeric Joint Sealant: Single-component nonsag urethane joint sealant complying with requirements in Section 07-9200 "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, for Use O.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

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. 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 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including foundation; accurate placement, pattern, orientation of anchor bolts, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.
- B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.
- C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.
- D. Place concrete, as specified in Section 033000 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
- E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.3 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Ground Set: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure. Install flagpole, plumb, in foundation tube.

1. Foundation Tube: Place tube seated on bottom plate between steel centering wedges and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 10-7500

SECTION 11-5213 - ELECTRICALLY OPERATED PROJECTION SCREENS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies electrically operated front projection screens and accessories.

1.02 RELATED SECTIONS

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

- A. Section 26-0500 - Common Work Results for Electrical: Power supply, conduit and wiring.
- B. Section 01-1200 – Multiple Contract Summary

1.03 DEFINITIONS

- A. Gain: Indication of screen's luminance or brightness, measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.
- B. Viewing Angle: Horizontal angle from perpendicular center of screen at which gain or brightness decreases by 50%.
- C. Format: Proportion of projection screen viewing area expressed as a ratio of width/height.
 - 1. NTSC or Video Format: 1.33:1.
 - 2. HDTV Format: 1.78:1.
 - 3. 16:10 Wide: 1.60:1.
 - 4. Cinemascope: 2.35:1.
 - 5. Letterbox: 1:85:1.
 - 6. Square: 1:1.

1.04 REFERENCES

- A. International Code Council (ICC):
 - 1. International Building Code.
- B. Society of Motion Picture and Television Engineers (SMPTE):
 - 1. SMPTE RP 94-2000, Gain Determination of Front Projection Screens.
- C. Underwriters Laboratories Inc. (UL).
- D. Underwriters' Laboratories of Canada (ULC).

1.05 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01-3300 - Submittal Procedures.
- B. Product Data: Submit product data, including manufacturer's technical product data sheet, for specified products.
 - 1. Material Safety Data Sheets (MSDS).
- C. Shop Drawings: Indicate dimensions, fabrication and installation details.
 - 1. Include electric wiring diagrams.

1.06 INFORMATION SUBMITTALS

PROJECTION SCREENS

A. Quality Assurance:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates: Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics, criteria and physical requirements.
3. Manufacturer's installation instructions.

1.07 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit for products in accordance with Section 01-7800 - Closeout Submittals. Include:

1. Manufacturer's instructions detailing maintenance requirements.
2. Parts catalog that includes complete list of repair and replacement parts, with cuts and identifying numbers.

1.08 QUALITY ASSURANCE

A. Qualifications:

1. Worker experienced in performing work of this section who has specialized in work similar to that required of this project.

B. Regulatory Requirements:

1. Comply with International Building Code (IBC)

C. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements and manufacturer's instructions.

1.09 DELIVERY, STORAGE & HANDLING

A. Storage and Protection:

1. Store electric projection screens in a dry, ventilated area, protected from exposure to harmful weather conditions, at a temperature less than 80 degrees F (27 degrees C).

B. Handling: Handle electrically operated projection screen materials with care in order to prevent damage.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1.010 PROJECT AMBIENT CONDITIONS

A. Project Location: Perform electrically operated projection screen work when temperatures are greater than 40 degrees F (4 degrees C).

1.011 SEQUENCING

A. Sequence With Other Work: Comply with projection screen manufacturer's written recommendations for sequencing construction operations.

1.012 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

C. Warranty: Commencing on date of acceptance by Architect

1.013 MAINTENANCE MATERIALS

A. Use standard product line parts produced by manufacturer of electrically operated projection screens.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Ensure manufacturer has minimum 5 years experience manufacturing components similar to or exceeding project requirements.
- B. Basis of Design Manufacturer: Da-Lite Screen Company, Inc.
 - 1. Contact: P.O. Box 137, 3100 N. Detroit St., Warsaw, IN 46581-0137; Telephone: (800) 622-3737, (574) 267-8101; Fax: (877) 325-4832, (574) 267-7804; E-mail: info@da-lite.com; website: www.da-lite.com.
- C. Substitutions as per Section 01-2500

2.02 PROPRIETARY PRODUCTS/PROJECTION SCREEN SYSTEMS

- A. Type 1: Wall or Ceiling Mounted Electrically Operated Projection Screen Systems.
 - 1. Screen Operation: Electrically operated, UL and ULC listed, retractable, with rigid metal roller.
 - 2. Motor: Housed inside metal roller. Includes automatic thermal overload protection, integral gears, capacitor and electric brake to prevent coasting, and preset, adjustable limit switches to automatically stop viewing surface in the UP or DOWN positions.
 - a. Type: 3-wire, permanently lubricated, reversal type designed for mounting inside roller and to suit project requirements.
 - b. Voltage, Frequency: 115 V, 60 Hz
 - c. Amperage: 2.4 amps maximum.
 - 3. Electric Controls: Wall mounted switch with integral junction box incorporated into screen housing.
 - a. Voltage, Frequency: 115 V, 60 Hz.
 - b. Switch: 3 position type with cover plate for UP, DOWN and STOP functions.
 - 4. Screen Mounting: Wall.
 - a. Include mounting hardware and roller mounting brackets that adjust to allow centering or offsetting of the screen within the case.
 - 5. Screen Case: Designed to receive mounting hardware and sized to suit projection screen.
 - a. Material: Extruded aluminum.
 - b. Design: 2-piece with curved contour flat-backed style with heavy-duty end caps concealing roller ends.
 - c. Finish:
 - 1) Case Front: Powder coated white.
 - 6. Screen Size:
 - a. Viewing Area: H 65 inches × W 116 inches
 - 7. Acceptable Material: Da-Lite Screen Company, Inc. Contour Electrol Projection Screen.
 - a. Non-Tensioned Screen Material:
 - 1) Front projection, flame retardant, mildew resistant fiberglass, black backing with standard black borders, easily cleaned with mild soap and water solution.
 - 2) Bottom of fabric to form a pocket holding a metal rod.
 - 3) Seams: Seamless

- b. Gain: To SMPTE RP 94-2000, 1.5.
- c. Format: HDTV - 1.78:1
- d. Acceptable Viewing Surface: Da-Lite Screen Company, Inc.:
 - 1) High Contrast Matte White

2.03 ACCESSORIES

- A. Screen Drop: Extra drop of 24 inches in black fabric at top, not to exceed 14 feet maximum total surface height, including picture area.
- B. Key Locking Cover Plate: Hinged cover plate with brushed stainless steel finish provides keyed access to 120 V wall switch.
- C. Installation Hardware: Fasteners and other components of type, size and spacing recommended by manufacturer for complete, functional and secure installation of electric screen.

2.04 PRODUCT SUBSTITUTIONS

- A. Substitutions: In accordance with Section 01-2500 - Product Substitution Procedures.

PART 3 EXECUTION

3.01 INSTALLERS

- A. Provide experienced and qualified technicians to install electrically operated projection screens.

3.02 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and Da-Lite Screen Company, Inc., technical data sheets.

3.03 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify that conditions of substrates previously installed under other sections or contracts are acceptable with electrically operated projection screen installation.
 - 2. Ensure electrical power supply is installed to meet electric projection screen requirements in accordance with Section 26 0500 - Common Work Results for Electrical.
 - a. Verify type and location of power supply.
 - 3. Inform Architect of unacceptable conditions immediately upon discovery.
 - 4. Proceed with installation only after unacceptable conditions have been corrected.

3.04 COORDINATION

- A. Coordinate electric projection screen placement with placement of other ceiling and wall mounted components.

3.05 INSTALLATION

PROJECTION SCREENS

- A. Install electric projection screens in accordance with reviewed shop drawings at locations and heights indicated.
- B. Install screen housing and make electrical connections in conjunction with installation of ceiling system.
 - 1. Verify locations with Architect prior to installation.
- C. Securely install screens plumb and level to supporting substrate.

3.06 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Have manufacturer's technical representative schedule site visits to review work as follows:
 - 1. Upon completion of work, after cleaning is carried out.
- B. Testing and Inspection: Operate each screen 3 times to ensure viewing surfaces extend and retract through full range of motion.
 - 1. Verify controls, limit switches, automatic doors and other components function as designed and meet project requirements.
 - 2. Ensure viewing surface raising operation fully engages and lifts screen closure door into closed position.
 - 3. Adjust motors, controls and components to allow for smooth, unobstructed screen operation.

3.07 FINAL CLEANING

- A. Perform cleanup in accordance with Section 01 7400 - Cleaning and Waste Management.
- B. Upon completion, remove surplus materials, rubbish, tools and equipment.

3.08 PROTECTION

- A. Protect electrically operated projection screens from damage during construction.
- B. Repair damage to adjacent materials caused by electrically operated projection screen work.

END OF SECTION

SECTION 12-2413 - ROLLER WINDOW SHADES

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. Shade Types: Motorized roller shades with single roller solar shades.
- B. Related Requirements:
 - 1. Division 06 Section Miscellaneous Rough Carpentry for wood blocking and grounds for mounting roller shades and accessories.
 - 2. Division 09 Gypsum Board Assemblies for coordination with gypsum board assemblies for blocking, installation of shade pockets, closures, and related accessories.
 - 3. Division 09 Acoustical Ceilings for coordination with acoustical ceiling systems for blocking, installation of shade pockets, closure and related accessories.
 - 4. Division 26 Sections for electrical service and connections for motors, controls, limit switches, and other powered devices and for system disconnect switches for motor-operated shades.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
 - 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For each type and color of shadeband material.
 - 1. Include samples of accessories involving color selection.
- D. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark inside face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 12 inches wide by 12 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.
- E. Control Systems Verification

1. Bid shall confirm that roller shade motors and all related controls shall be integrated into a compatible control system as specified herein and are being bid as the work of this section.
- F. Roller-Shade Schedule: Use same designations indicated on Drawings.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Certificates: For each type of shadeband material, signed by product manufacturer.
 - C. Product Test Reports:
 1. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
 2. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.
 3. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For roller shades to include in maintenance manuals.
- 1.6 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Roller Shades:
 - a. Fabric equal to 5 percent of quantity installed for each color, and shadeband material indicated.
 - b. Brackets equal to 5 percent of quantity installed for each type on project.
 - c. Motors equal to 5 percent of quantity installed for each type on project.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: Installer trained and certified by the manufacturer having at least ten years experience installing products comparable to those specified in this section.
- 1.8 WARRANTY
- A. Roller Shade Hardware and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.

- B. Roller Shade Motors and Motor Control Systems: Manufacturer’s standard non-depreciating five year warranty extended to eight years if turnkey wired.
- C. Roller Shade Installation: One year from date of substantial completion, not including scaffolding, lifts and other means of access.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Mecho/5X roller shades and Mecho’s WhisperShade IQ2 roller shades.
- B. Acceptable Alternate Manufacturer’s where Product is Equal:
 1. World Wide Window Fashions: Coulisse Absolute Roller 2.0
 2. Lutron Electronics: Palladiom Shading System
 3. Silent Gliss: SG Series Chain and Motor Shades
 - 4. Legrand ES Series**
- C. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MOTOR OPERATED SOLAR SHADES WITH SINGLE ROLLER

- A. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Motor: WhisperShade IQ2 System as manufactured by Mecho. Intelligent encoded system (software, two-way communication), tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor. Low voltage motors do not meet the intent of this specification.
 - a. Electrical Characteristics: Single phase, 110 V, 60 Hz
 - b. Motor Noise Rating: Use motors rated as 42 – 46 dbA measured at three feet open air.
 - c. Motor Location: Conceal motors inside shade motor tube.
 - d. Maximum current draw shall be 1.8A.
 - e. Motors shall have minimum rating of 34RPM that shall not vary due to load or lift capacity.
 - f. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade EDU and tube assembly.
3. Other systems may be acceptable providing all of the following performance criteria:
 - a. Two methods of control:
 - 1) Local Dry Contact Control Inputs to support moving the shade to upper and lower limits, support moving the shade to local switch preset positions, and shall support configuring the EDU under protected sequences so that a typical user would not change the EDU's setup. At minimum, the configuration should include setting limits, setting custom presets and configuring key modes of operation.
 - 2) Network Control shall be equipped with a bi-directional network communication capability in order to support commanding the operation of large groups of shades over a common backbone. The network communication card shall be embedded into the tubular EDU assembly.
4. Limit Switches: Provide programming of upper and lower stopping points (operating limits) of shade band's into motors via a hand held removable program module configurator or a local switch.
5. Wall Switches: IQ-Switch in 5 or 10 button, single gang backbox, low voltage.
6. Operating Features:
 - a. Group switching with integrated five button, single gang switch control.
 - b. Provide intermediate stopping positions for shades that allow for up to three (3) repeatable and precise aligned positions. All shades on the same switch circuit with the same opening height shall align at each intermediate stopping position
 - c. Provide two modes of operation, uniform and regular. Uniform mode shall allow for shades to only move to intermediate stop positions. Regular mode shall allow for shades to move to both intermediate stop positions, plus any position desired between the upper and lower limits as set by the installer
 - d. Capable of interface with audiovisual control system.
7. Wireless Sun Sensor Control:
 - a. Basis of Design: MechoNet Wireless Daylight Sensor
 - b. Sensor shall be solar powered photovoltaic requiring no wires or batteries.
 - c. Sensor shall operate using EnOcean wireless technology, 902 MHz.
 - d. Sensor shall have a temperature range between 32-140 degree Fahrenheit.
 - e. Sensor shall have a sensitivity of 0-65 klux.
 - f. Photosensor shall be daylight spectrum photopic with a field of view as follows: horizontal – 60 degree cone angle, vertical – 30 degrees north and 30 degrees south.
 - g. Provide intermediate stopping positions that allow for five customizable stops, three intermediate positions between upper and lower limit.
 - h. Wireless range shall be 80 ft unobstructed.

- i. Wireless receiver shall be two-way communication.
 - j. Manual override shall have maximum timeout of 255 minutes or return to automation during night mode settings.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required for accommodating operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Roller Drive-End Location: Closest proximity to J Box.
 2. Direction of Shadeband Roll: Regular, from back of roller.
 3. Shadeband-to-Roller Attachment: Removable spline fitting integral channel in tube.
- C. Mounting Hardware: Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
1. Basis of Design: Mecho's Electro/1 Bracket
 2. Basis of Design: Mecho's Electro/2 Bracket

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Identify products appropriate markings of applicable testing agency.
- B. Shadebands:
1. Solar Shadeband Material:
 - a. Basis of Design: Mecho 1500 Series ThermoVeil
 - b. Openness Factor: 3%
 - c. Type: 75% PVC (coating), 25% Polyester (yarn)
 - 1) Fiberglass yarns are not acceptable.
 - d. Roll Width: 63, 96, and 126 inches.
 - e. Orientation on Shadeband: As indicated on Drawings.
 - f. Color: As selected by Architect from manufacturer's full range.
 - g. Hembar: Steel or extruded aluminum hembar in enclosed welded pocket.
 - 1) Hem tubes and open hembar pockets are not acceptable.

2.4 INSTALLATION ACCESSORIES

- A. Roller Shade Pocket:
1. Gypsum Board pocket with continuous overhead blocking for Shade Types ~~XXXX-x~~ provided by others.
 2. No cost pocket with continuous overhead blocking for Shade Types ~~XXXX-x~~ provided by others.
 3. Metal pocket to be provided by shade contractor.
 - a. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades.
 - b. Basis of Design for MANS-3: Mecho Shade 4123 Pocket
 - c. Basis of Design for MOTS-2 & MOTS-4: Mecho Shade ElectroPocket 4155 with Tile Support
 - d. Basis of Design for MOTS-1: Mecho Shade ElectroPocket 4156 without Tile Support
- B. Closure and Closure Mount: Provided by shade contractor for Shade Types ~~XXXX-x~~.

1. Provide exposed extruded aluminum closure mount and removable **3"** closure panel to provide access to shades.
- C. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners
 1. Shape: L-shaped.
 2. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open.
- D. End Caps: Provided by shade contractor for all exposed shade brackets.
- E. Accessories Color and Finish: As selected from manufacturer's full range.

2.5 ROLLER-SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 1. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
 1. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

- C. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
 2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
 3. Roller shade installer/dealer shall run line voltage (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
 4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
 5. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12-2413

SECTION 13-2168 – BULLET RESISTANT EQUIPMENT

GENERAL

1.1 SECTION INCLUDES

- A. Bullet Resistant Transaction Windows and Frames.
- B. Bullet Resistant Opaque Armor.
- C. Bullet Resistant Currency Trays.
- D. Bullet Resistant Speak Thru

1.2 RELATED SECTIONS

- A. Section 06-1000 – Rough Carpentry.
- B. Section 08-7100 – Hardware.

1.3 REFERENCES

- A. ASTM A 666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar.
- B. ASTM B 209/B 209M – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. NIJ Standard 0108.01 – (National Institute of Justice) Standard for Ballistic Resistant Protective Materials.
- D. Underwriters Laboratories: UL 752 – Standard for Bullet Resisting Equipment.

1.4 PERFORMANCE REQUIREMENTS

- A. Design, fabricate and install all partition materials specified in this section to meet or exceed the requirements of UL 752.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01-3300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.

3. Installation methods.

- C. Shop Drawings: Submit Manufacturer approved shop drawings detailing plan, section and elevation views as necessary to ensure proper field installation procedures. Coordinate locations with those listed in the Contract Drawings.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Total Security Solutions: 170 National Park Dr., Fowlerville, MI 48836; Tel: 517-223-7807; Fax: 517-223-0805; Email: [request info \(info@tssbulletproof.com\)](mailto:info@tssbulletproof.com);
- B. Requests for substitutions will be considered in accordance with provisions of

Section 01-2500.

2.2 COMPONENTS

- A. Glazing: Bullet Resistant Glazing:
 - 1. Rating: UL 752 Level 3.
 - 2. Glazing Thickness: 1 1/4 inch (32mm).
- B. Aluminum Sections: Extruded aluminum alloy 6063 T5 manufactured in accordance with ASTM B209. Anodized finish.
 - 1. Glazing Channel: U-Channel specifically designed for securing transparencies tightly in place. Angles and stops are only acceptable for top attachment.

2.3 OPAQUE ARMOR

- A. Bullet resistant fiberglass armor tested and approved to meet U.L. 752 for the level of protection specified.
 - 1. Model: 7.
 - a. Rating: UL 752 Level 7, UN Listed.
 - b. Panel Thickness: 1.1/8" inch.
 - c. Panel Weight: 11.7 Lbs per square foot.

2.4 CURRENCY TRAYS

- A. Mounting: Recessed with Bullet Trap.
 - 1. Dimensions: 16 inches by 8 inches by 1-1/2 inches (406mm x 203mm x 38mm).
- B. Finish:
 - 1. Finish: Brushed Stainless Steel.

2.5 SPEAK THRU

- A. Creative Industries SC-100, Level 3

2.6 STRUCTURAL SUPPORTS

- A. Where installation requires lateral bracing, locate braces no wider than 96 inches (2438mm) on centerlines. The depth of the brace below the counter and vertical support (brace) above the counter must maintain a ratio of at least 20 percent of the total installation height.
- B. Install 1 1/2 inch (39mm) square steel tube braces below the counter and hoods with a minimum wall thickness of 1/8 inch (3mm). Welded in place and include two vertical and horizontal members. Bolt or weld a diagonal member between the two horizontal members.

- C. Extend braces located above the counter and hoods to the top of the acrylic slotted jump shield. Material to be of the specified bullet resistant material. At no time shall the vertical supports be less than 10 inches (254mm) in depth.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

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

SECTION 31-1000 - SITE CLEARING

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. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities and abandoning site utilities in place.
7. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Section 015000 "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities and temporary erosion- and sedimentation-control measures.
2. Section 017300 "Execution" for field engineering and surveying.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

- E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or videotape.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Township Building.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.
- C. Utility Locator Service: Notify Call Before You Dig or One Call for area where Project is located before site clearing.

- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control, plant-protection and thermal well protection measures are in place.
- E. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remainProtect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
 - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- E. Excavate for and remove underground utilities indicated to be removed.

- F. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities sections and Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 15 feet.
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31-1000

SECTION 31-2000 - EARTH MOVING

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. Preparing subgrades for slabs-on-grade, walks, pavements and grasses.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subsurface drainage backfill trenches.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.
7. Excavating well hole to accommodate elevator-cylinder assembly.

- 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 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Geotextiles.
 - 2. Controlled low-strength material, including design mixture.
 - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Geotextile: 12 by 12 inches.
 - 2. Warning Tape: 12 inches long; of each color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.

- C. Blasting plan approved by authorities having jurisdiction.
- D. Seismic survey report from seismic survey agency.
- E. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

- A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:
 - 1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
 - 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- C. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.
- D. Preexcavation Conference: Conduct conference at Township offices.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. "One Call" for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 01-5000 "Temporary Facilities and Controls," and Section 31-1000 "Site Clearing," are in place.
- D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust towards protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. Liquid Limit: 40 max
 2. Plasticity Index: 10 max.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 sieve.

- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 1; AASHTO M 288.
 - 2. Grab Tensile Strength: 158 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 70 lbf; ASTM D 4632.
 - 4. Tear Strength: 56 lbf; ASTM D 4533.
 - 5. Puncture Strength: 56 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 50 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 70 percent after 150 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 4; AASHTO M 288.
 - 2. Grab Tensile Strength: 270 lbf ; ASTM D 4632.
 - 3. Sewn Seam Strength: 240 lbf; ASTM D 4632.
 - 4. Tear Strength: 100 lbf ASTM D 4533.
 - 5. Puncture Strength: 100 lbf ; ASTM D 4833.
 - 6. Apparent Opening Size: No. 50 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 70 percent after 150 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.
- B. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

1. Perform blasting without damaging adjacent structures, property, or site improvements.
2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions. See geotechnical report included with these specifications for reference.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs-on-grade.
6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch . If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
 - 3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
 - 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 3500 psi , may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.

4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches the pipe or conduit. Coordinate backfilling with utilities testing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.

- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place base course material over subbase course under hot-mix asphalt pavement.
 - 3. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 4. Place subbase course 6 inches or less in compacted thickness in a single layer.
 - 5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight.

3.18 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - 2. Determine that fill material and maximum lift thickness comply with requirements.
 - 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31-2000

SECTION 31-2000 - EARTH MOVING

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. Preparing subgrades for slabs-on-grade, walks, pavements and grasses.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subsurface drainage backfill trenches.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.
7. Excavating well hole to accommodate elevator-cylinder assembly.

- 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 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Geotextiles.
 - 2. Controlled low-strength material, including design mixture.
 - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Geotextile: 12 by 12 inches.
 - 2. Warning Tape: 12 inches long; of each color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.

- C. Blasting plan approved by authorities having jurisdiction.
- D. Seismic survey report from seismic survey agency.
- E. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

- A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:
 - 1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
 - 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- C. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.
- D. Preexcavation Conference: Conduct conference at Township offices.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. "One Call" for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 01-5000 "Temporary Facilities and Controls," and Section 31-1000 "Site Clearing," are in place.
- D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust towards protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. Liquid Limit: 40 max
 2. Plasticity Index: 10 max.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 sieve.

- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 1; AASHTO M 288.
 - 2. Grab Tensile Strength: 158 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 70 lbf; ASTM D 4632.
 - 4. Tear Strength: 56 lbf; ASTM D 4533.
 - 5. Puncture Strength: 56 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 50 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 70 percent after 150 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 4; AASHTO M 288.
 - 2. Grab Tensile Strength: 270 lbf ; ASTM D 4632.
 - 3. Sewn Seam Strength: 240 lbf; ASTM D 4632.
 - 4. Tear Strength: 100 lbf ASTM D 4533.
 - 5. Puncture Strength: 100 lbf ; ASTM D 4833.
 - 6. Apparent Opening Size: No. 50 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 70 percent after 150 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.
- B. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

1. Perform blasting without damaging adjacent structures, property, or site improvements.
2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions. See geotechnical report included with these specifications for reference.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs-on-grade.
6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch . If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
 - 3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
 - 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 3500 psi , may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.

4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches the pipe or conduit. Coordinate backfilling with utilities testing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.

- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place base course material over subbase course under hot-mix asphalt pavement.
 - 3. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 4. Place subbase course 6 inches or less in compacted thickness in a single layer.
 - 5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight.

3.18 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - 2. Determine that fill material and maximum lift thickness comply with requirements.
 - 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31-2000

SECTION 31-5000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes temporary excavation support and protection systems.
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary utilities and support facilities.
 - 2. Division 31 Section "Dewatering" for dewatering system for excavations.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 4. Monitor vibrations, settlements, and movements.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For excavation support and protection system.
- B. Delegated-Design Submittal: For excavation support and protection system 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. Qualification Data: For qualified architect and professional engineer.

B. Other Informational Submittals:

1. Photographs or Videotape: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.
2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
 - a. Note locations and capping depth of wells and well points.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site .

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
 - a. Geotechnical report.
 - b. Existing utilities and subsurface conditions.
 - c. Proposed excavations.
 - d. Proposed equipment.
 - e. Monitoring of excavation support and protection system.
 - f. Working area location and stability..
 - g. Abandonment or removal of excavation support and protection system.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
 1. Notify Architect and Owner no fewer than two days in advance of proposed interruption of utility.
 2. Do not proceed with interruption of utility without Architect and Owner written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.
 1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
 2. The geotechnical report is included elsewhere in the Project Manual.

- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Shotcrete: Comply with Division 03 Section "Shotcrete" for shotcrete materials and mixes, reinforcement, and shotcrete application.
- D. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- E. Reinforcing Bars: ASTM A 615/A 615M, see plans, deformed.
- F. Tiebacks: Steel bars, ASTM A 722/A 722M.
- G. Tiebacks: Steel strand, ASTM A 416/A 416M.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 TIEBACKS

- A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
 - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
 - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

3.3 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.4 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
 - 2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."
 - 3. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION 31-5000

SECTION 32-1216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Cold milling of existing asphalt pavement.
- 2. Hot-mix asphalt patching.
- 3. Hot-mix asphalt paving.
- 4. Hot-mix asphalt overlay

B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for demolition and removal of existing asphalt pavement.
- 2. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
- 3. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include technical data and tested physical and performance properties.

2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
3. Job-Mix Designs: For each job mix proposed for the Work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: In accordance with Penn DOT standards and specifications publication 408, latest version.
- B. Material Certificates: For each paving material Retain "Material Test Reports" Paragraph below for material test reports that are Contractor's responsibility.
- C. Material Test Reports: For each paving material, by a qualified testing agency.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: In accordance with Penn DOT standards and specifications publication 408, latest version.
- B. Retain "Testing Agency Qualifications" Paragraph below if Contractor or manufacturer selects testing agency or if Contractor is required to provide services of a qualified testing agency in "Field Quality Control" Article. Qualification requirements are in addition to those specified in Section 014000 "Quality Requirements," which also defines "NRTL" (nationally recognized testing laboratory).
- C. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of In accordance with Penn DOT standards and specifications publication 408, latest version.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 1. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 2. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- A. Coarse Aggregate: Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.
- B. Fine Aggregate: [Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.
- C. Mineral Filler: Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.
- A. Asphalt Cement: Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.
- B. Water: Potable.

2.3 AUXILIARY MATERIALS

- A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

2.4 MIXES

- A. Hot-Mix and Warm-Mix Asphalt: Dense-graded, hot-laid, hot-mix and Warm-Mix Asphalt asphalt plant mixes approved by the Pennsylvania Department of Transportation. complying with the following requirements:
- B. Asphalt mixes and plants shall comply with the Pennsylvania Department of Transportation standards and specification in Publication 408 latest version.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 - 1. Mill to a depth of 1-1/2 inches.
 - 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 - 3. Control rate of milling to prevent tearing of existing asphalt course.
 - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
 - 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
 - 6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
 - 7. Handle milled asphalt material according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."
 - 8. Keep milled pavement surface free of loose material and dust.
 - 9. Do not allow milled materials to accumulate on-site.

3.3 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 24 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.
 - 1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.

2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.
 - D. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch .
 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 1. Protect primed substrate from damage until ready to receive paving.

3.6 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 2. Place hot-mix asphalt surface course in single lift.
 3. Spread mix at a minimum temperature of 250 deg F.
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
 - 2. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 24 inches .
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 - 5. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: PennDOT 408 standards and specifications.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
 - 1. Surface Course: 1/8 inch .
 - 2. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. Asphalt Traffic-Calming Devices: Finished height of traffic-calming devices above pavement will be measured for compliance with tolerances.
- A. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to In accordance with Penn DOT standards and specifications publication 408, latest version. .
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- B. Replace and compact hot-mix asphalt and warm-mix asphalt where core tests were taken.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.10 WASTE HANDLING

- A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 32-1216

SECTION 32-1313 - CONCRETE SIDEWALK

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. Curbs and gutters.
 - 2. Walks.
- B. Related Sections:
 - 1. Section 321316 "Decorative Concrete Paving" for stamped concrete other than detectable warnings.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.
- C. Other Action Submittals:
 - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: In accordance with Penn DOT standards and specifications publication 408, latest version.

- B. Retain first paragraph below for material certificates from manufacturers.
- C. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.
- D. Material Test Reports: For each of the following:
 - A. Aggregates In accordance with Penn DOT standards and specifications publication 408, latest version.
 - 1. Retain paragraph below if Contractor is responsible for field quality-control testing and inspecting.
 - B. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
- B. Ready-Mix-Concrete 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" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- E. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- F. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:
 - a. Concrete mixture design.
 - b. Quality control of concrete materials and concrete paving construction practices.
2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete paving subcontractor.
 - e. Manufacturer's representative of stamped concrete paving system used for detectable warnings.

1.7 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- C. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.
- D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.

- E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars; assembled with clips.
- F. Plain-Steel Wire: ASTM A 82/A 82M

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, white portland cement Type I air-entrained per latest Penn DOT publication 408 standards and specifications
- B. Water: Potable and complying with ASTM C 94/C 94M.
- C. Air-Entraining Admixture: ASTM C 260.
- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 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. ChemMasters.
 - b. Davis Colors.
 - c. Dayton Superior Corporation.
 - d. Elementis Pigments.
 - e. Hoover Color Corporation.
 - f. Lambert Corporation.
 - g. LANXESS Corporation.
 - h. QC Construction Products.
 - i. Scofield, L. M. Company.
 - j. Solomon Colors, Inc.
 - k. Stampcrete International, Ltd.
 - l. SureCrete Design Products.

2. Color: Owner will provide color selection for stamped concrete.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating in accordance with the latest Penn DOT publication 408 standards and specifications.

2.5 RELATED MATERIALS

- A. Joint Fillers: in accordance with the latest Penn DOT publication 408 standards and specifications.in preformed strips.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

1. Color: Color selection to be provided by the owner for the stamped concrete.

- C. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.

- D. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi air entrained.

- E. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.
2. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.

3. Air Content: 5 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.
- F. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 1. When air temperature is between 85 and 90 deg F , reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F , reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete batches larger than 1 cu. yd. , increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
- F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum **2-inch (50-mm)** overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.

2. Provide tie bars at sides of paving strips where indicated.
 3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 20 feet unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

- B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F , uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
 3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. 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.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing compound or a combination of these as follows:
 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, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: 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 at least one composite sample for each 10 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - 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; 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 and below and when it is 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if 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 200 psi.

- D. 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.
- E. 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.
- F. 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.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.10 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32-1313

SECTION 32-9200 - TURF AND GRASSES

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. Seeding.
- 2. Hydroseeding.
- 3. Sodding.

B. Related Sections:

- 1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
- 2. Section 312000 "Earth Moving" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- B. Qualification Data: For qualified landscape Installer.
- C. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.
- E. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- F. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 - 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 - 3. Report suitability of tested soil for turf growth.

- a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
- b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

G. Preinstallation Conference: Conduct conference at Project site

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.
- C. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk fertilizers[, **lime,**] and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. In subparagraphs below, insert specific dates for spring and fall plantings of seed, sod, plugs, sprigs, and meadows if required.
 1. Spring Planting: March 15
 2. Fall Planting: August 15
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:
1. Seeded Turf: 60 days from date of Substantial Completion
 - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species as follows:
- C. Seed Species: Seed of grass species as follows, See plan notes for seed and rate pf application. Limestone is used to raise pH and neutralize acidic soils. In first paragraph below, insert percentages of carbonates, calcium, and magnesium if required. Revise to a pelleted form of limestone with a water-soluble binder that speeds breakdown if required.
- D. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
- E. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- F. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- G. Aluminum Sulfate: Commercial grade, unadulterated.
- H. Perlite: Horticultural perlite, soil amendment grade.
- I. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- J. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

- K. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- L. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.2 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

2.4 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1/2 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.

3. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
1. Do not use wet seed or seed that is moldy or otherwise damaged.
 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of 2 lb/1000 sq. ft Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- C. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

3.5 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

3.6 TURF RENOVATION

- A. Renovate existing turf.
- B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
 2. Install new planting soil as required.

- C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
- D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.
- E. Mow, dethatch, core aerate, and rake existing turf.
- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of **6 inches (150 mm)**.
- I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.
- J. Apply seed and protect with straw mulch as required for new turf.
- K. Water newly planted areas and keep moist until new turf is established.

3.7 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf

growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow bermudagrass to a height of 1/2 to 1 inch .

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 50-50-50 per acre to turf area.

3.8 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 32-9200

SECTION 33-0500 - COMMON WORK RESULTS FOR UTILITIES

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. Piping joining materials.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.5 COORDINATION

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
- B. Solvent Cements for Joining Plastic Piping:
 - 1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 2. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

- A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

3.2 PIPING INSTALLATION

- A. Install piping according to the following requirements and utilities Sections specifying piping systems.
- B. Install piping at indicated slopes.
- C. Install piping free of sags and bends.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.
- B. .
- C. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. PVC Nonpressure Piping: Join according to ASTM D 2855.

END OF SECTION 33-0500

SECTION 33-4100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Pipe and fittings.
2. Cleanouts.
3. Drains.
4. Catch basins.
5. Stormwater inlets.
6. Pipe outlets.
7. Dry wells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
 2. stormwater inlets Include plans, elevations, sections, details, frames, covers, and grates.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

- D. Handle stormwater inlets according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Architect and Owner no fewer than two days in advance of proposed interruption of service.

PART 2 - PRODUCTS

2.1 ABS PIPE AND FITTINGS

- A. ABS Sewer Pipe and Fittings: ASTM D 2751, with bell-and-spigot ends for gasketed joints.
 - 1. NPS 3 to NPS 6: SDR 35.
- B. Gaskets: ASTM F 477, elastomeric seals.

2.2 PE PIPE AND FITTINGS

- A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.
 - 1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
 - 2. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.
- B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60 : AASHTO M 294M, Type S, with smooth waterway for coupling joints.
 - 1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.
 - 2. Soiltight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

2.3 PVC PIPE AND FITTINGS

- A. PVC Corrugated Sewer Piping:
 - 1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
 - 3. Gaskets: ASTM F 477, elastomeric seals.

B. PVC Profile Sewer Piping:

1. Pipe: ASTM F 794, PVC profile, gravity sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 1. Install piping pitched down in direction of flow.
 2. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

3.3 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
 1. Use Medium-Duty, top-loading classification drains in paved foot-traffic <Insert other> areas.

- B. Fasten grates to drains if indicated.
- C. Set drain frames and covers with tops flush with pavement surface.
- D. Assemble trench sections with flanged joints.
- E. Embed trench sections in [4-inch (102-mm)] <Insert dimension> minimum concrete around bottom and sides.

3.4 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.5 IDENTIFICATION

- A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
 - 1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.6 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 33-4100