INTRODUCTORY INFORMATION

B L A N K P A G E

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PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

INTRODUCTORY INFORMATION

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BIDDING REQUIREMENTS

FIXED SUM PROJECT (U.S.)

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INVITATION TO BID (U.S.)

1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:

Ed Hall Construction
Broderick and Henderson
M&D and Sons Construction
J&H Thompson Construction
Saunders Construction

2. PROJECT:

Huntsville 1, 2, South Fork
Huntsville Utah Stake

3. LOCATION:

277 South 7400 East
Huntsville, Utah 84317

4. OWNER:

Corporation of the Presiding Bishop of
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Utah North PM Office
PO Box 13328
Ogden, Utah 84412-3328

5. CONSULTANT:

McNeil Group Inc.
8610 South Sandy Parkway, Suite 200
Sandy, Utah 84070

6. DESCRIPTION OF PROJECT:

A. Roof / Seismic

B. Products or systems may be provided under a Value Managed Relationship (VMR) the Owner has negotiated with the supplier. VMR products and systems are indicated as such in the Specifications.

7. TYPE OF BID: Bids will be on a lump-sum basis. Segregated bids will not be accepted.

8. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be 120 calendar days and will be as noted in the Agreement.

9. BID OPENING: Sealed bids will be received at 2:00 p.m. on June 6, 2019 at Utah North PM Office - 435 N Wall Ave., Ste D, Ogden to be announced. Bids will be publicly opened at 2:00 p.m. on June 6, 2019 at Utah North PM Office - 435 N Wall Ave., Ste D, Ogden to be announced.

10. BIDDING DOCUMENTS:

A. Bidding Documents may be examined at the following plan room locations:

1) Dodge Data and Analytics

www.construction.com
Att: Sherry Roe
Phone: 801-266-4209 / 800-747-5722
Fax: 801-606-7722
Email: Sherry.Roe@construction.com

2) Mountainlands Area Plan Room
583 West 3560 South, Suite 4
Salt Lake City, UT 84115
Att: Mike Luke
Phone: 801-288-1188
Fax: 801-288-1184
Email: mike@maprutah.com

3)

4)

B. Bidding Documents may be obtained at the Architect's office with a refundable deposit of $25.00 per set. Deposit will be refunded if documents are returned complete and in good condition within five days of bid opening.

11. BID BOND: Bid security in the amount of 5 percent (5%) of the bid will accompany each bid in accordance with the Instruction to Bidders.

12. BIDDER'S QUALIFICATIONS: Bidding by the General Contractors will be by invitation only.

13. OWNER'S RIGHT TO REJECT BIDS: The Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DEFINITIONS:

A. The definitions set forth in Section 1 of the General Conditions are applicable to the documents included under Bidding Requirements.

B. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The proposed Contract Documents consist of the documents identified as Contract Documents in the Form of Agreement, except for Modifications. The Bidding Requirements are those documents identified as such in the proposed Project Manual.

C. Addenda are written or graphic documents issued by the Architect prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Form of Agreement upon execution of the Contract.

2. BIDDER'S REPRESENTATIONS:

A. By submitting a bid, the bidder represents that
   1) Bidder has carefully studied and compared the Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
   2) Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect the contract work, and has correlated its personal observations with the requirements of the proposed Contract Documents, and
   3) Bid is based on the materials, equipment, and systems required by the Bidding Documents without exception.

3. BIDDING DOCUMENTS:

A. Copies
   1) Bidding Documents may be obtained as set forth in the Invitation to Bid.
   2) Partial sets of Bidding Documents will not be issued.
   3) Bidders will use complete sets of Bidding Documents in preparing bids and make certain that those submitting sub-bids to them have access to all portions of the documents that pertain to the work covered by sub-bid, including General Conditions, Supplementary Conditions, and Division 01. Bidder assumes full responsibility for errors or misinterpretations resulting from use of partial sets of Bidding Documents by itself or any sub-bidder.

B. Interpretation or Correction of Bidding Documents
   1) Bidders will request interpretation or correction of any apparent errors, discrepancies and omissions in the Bidding Documents.
   2) Corrections or changes to Bidding Documents will be made by written addenda.

C. Substitutions and Equal Products
   1) Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
   2) The terms *'Acceptable Manufacturers', 'Approved Manufacturers 'Suppliers', Installers'* and *'VMR (Value Managed Relationship) Manufacturers / Suppliers / Installers'* are used throughout the Project Manual to differentiate among the options available to Contractor regarding specified products, manufacturers, and suppliers. See Section 016000 for options available regarding acceptance of equal products.
   3) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding Documents.

4) Architect is only authorized to consider requests for approval of equal products to replace specified products in Sections where the heading '*Acceptable Manufacturers*' is used and statement, *'Equal as approved by Architect before bidding. See Section 016000'* or *'Equal as approved by Architect before installation. See Section 016000,'* appears. In Sections where the afore-mentioned statements do not appear and a different heading is used, Architect is authorized as Owner's representative to decline consideration of requests for approval of equal products. Approvals of equal products in such Sections must be made by Owner and will generally be for subsequent Projects.

D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

4. BIDDING PROCEDURES:

A. Form and Style of Bids
1) Use Owner's Bid Form.
2) Fill in all blanks on Bid Form. Signatures will be in longhand and executed by representative of bidder duly authorized to make contracts.
3) Bids will bear no information other than that requested on bid form. Do not delete from or add to the information requested on the bid form.

B. Bid Security
1) Each bid will be accompanied by a bid bond naming Owner, as listed in the Agreement, as obligee. If Bidder refuses to enter into a Contract or fails to provide bonds and insurance required by the General Conditions, amount of bid security will be forfeited to Owner as liquidated damages, not as a penalty.
2) Bid bond will be issued by a surety company meeting requirements of the General Conditions for surety companies providing bonds and will be submitted on AIA Document A310, Bid Bond or AIA authorized equivalent provided by surety company. The attorney-in-fact who executes the bond on behalf of the surety will affix to the bond a certified and current copy of the power of attorney.
3) Owner may retain bid security of bidders to whom an award is being considered until -
a. Contract has been executed and bonds have been furnished,
b. Specified time has elapsed so bids may be withdrawn, or
c. All bids have been rejected.

C. Submission of Bids
1) Submit bid in sealed opaque envelope containing only bid form and bid security. Envelopes will be sealed, bear bidder's name, and include the following:

BID FOR

_____ (Project Name) _____
_____ (number) _____

If bid is sent by mail, enclose sealed envelope in separate mailing envelope with notation 'SEALED BID ENCLOSED' on face.
2) It is bidder's sole responsibility to see that its bid is received at specified time. Bids received after specified bid opening time will be returned to bidders unopened.
3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

D. Modification or Withdrawal of Bid
1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
2) Prior to bid opening, bidders may withdraw bid by written request or by reclaiming bid envelope.
3) Prior to bid opening, bidder may mark and sign on the sealed envelope that bidder

acknowledges any or all Addenda.

5. CONSIDERATION OF BIDS:

A. Opening of Bids - See Invitation to Bid.

B. Rejection of Bids - Owner reserves right to reject any or all bids and to waive any irregularity therein.

C. Acceptance of Bid
   1) No bidder will consider itself under contract after opening and reading of bids until Agreement between Owner and Contractor is fully executed.
   2) Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

6. POST-BID INFORMATION:

A. The conditionally accepted bidder submitting a bid involving subcontractors will submit its list of proposed subcontractors in a meeting to be held immediately after bid opening.

7. PERFORMANCE BOND AND PAYMENT BOND:

A. Bond Requirements - Performance Bond and Labor and Material Payment bond will be required for this Project as specified in the General Conditions.

B. Time of Delivery of Bonds - Bonds will be delivered to Owner with Agreement signed by bidder.

8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be “Agreement Between Owner and Contractor for a Fixed Sum (U.S.)” provided by Owner.

9. MISCELLANEOUS:

A. Pre-Bid Conference
   1) A pre-bid conference will be held at a time and place to be announced.

B. Liquidated Damages - Conditions governing liquidated damages are specified in the General Conditions and in the Supplementary Conditions.

C. Examination Schedule for Existing Building and Site
   1) For visits after pre-bid meeting, contact local representative - Keith Preece, at (801) 430-1173

D. Exemption from local taxes - See Supplementary Conditions

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INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. Geotechnical Report -

1) Owner has secured the services of a geotechnical engineer to aid in design of the Project. Following conditions apply -

a) A geotechnical report has been prepared by none, referred to as the Geotechnical Engineer.

b) A copy of this report will be issued to each invited Contractor.

c) This report was obtained solely for use in design by Consultant and is not a part of the Contract Documents. It is not intended that Contractor rely on geotechnical engineer's report.

d) Reports are provided for Contractor's information but are not a warranty of subsurface conditions.

2) Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material. The following have been identified as containing asbestos in the areas of the building being worked on as part of this Project:

1) none

B. Refer to Section , Article for requirements to be followed.

END OF DOCUMENT

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SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST

Project Name: _____ Date:_____

Stake: _____ Project No: _____

General Contractor: _____

General Contractor is to provide the names of the following subcontractors and suppliers to the Owner's Project Manager immediately following the bid opening:

VMR SUBCONTRACTORS

Roofing _____

Doors, Frames & Hardware _____

Storefronts _____

Wood Flooring _____

Other _____

Other _____

SUBCONTRACTORS AND SUPPLIERS

Grading / Site work _____

Site Utilities _____

Demolition _____

Paving _____

Termite Control _____

Site Concrete _____

Fencing _____

Irrigation System _____

Landscaping _____

Building Concrete _____

Masonry _____

Structural Steel _____

Framing _____

Trusses _____

Insulation _____

EIFS _____

Soffit / Fascia _____

Steeple _____

Millwork _____

Drywall _____

Ceramic Tile _____

Acoustical Tile _____

Painting _____

Wall Coverings _____

Elevators / Lifts _____

Draperies _____

Fire Sprinklers _____

Plumbing _____

HVAC _____

Electrical _____

Controls _____

Sound / Satellite _____

EQUAL PRODUCT APPROVAL REQUEST FORM (U.S.)

Project Name: _____ Request Number: _____

TO: _____

FROM: _____

BID DATE: _____

A proposed product is not legally approved and cannot legally be included in a bid or used in the Work until it appears in an Addendum or other Contract Modification as defined in the General Conditions. See Instructions To Bidders Paragraph 3.C, General Conditions, and Section 016000.

PROPOSED EQUAL PRODUCT:

Specification Section: _____

Specified Products: _____

Proposed Product: _____

The Undersigned certifies:

1. Proposed equal product has been fully investigated and determined to be equal or superior in all respects to specified products.
2. Same warranty will be furnished for proposed equal product as for specified products.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed equal product will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Proposed equal product does not affect dimensions and functional clearances.

ATTACHMENTS:

Include the following attachments -

1. Copy of the Project Manual Section where the proposed equal product would be specified, rewritten or red-lined to include any changes necessary to correctly specify the proposed equal product. Identify completely changes necessary to the original Project Manual Section.
2. Copies of details, elevations, cross-sections, and other elements of the Project Drawings redone as necessary to show changes necessary to accommodate proposed equal product. Identify completely the changes from the original Drawings.
3. Complete product literature and technical data, installation and maintenance instructions, test results, and other information required to show complete conformance with requirements of the Contract Documents.

SIGNED: _____

Printed Name _____

Company _____

Address _____

City, State, Zip Code _____

Telephone _____ Fax _____

REVIEW COMMENTS:

_____ Accepted. See Addenda Number _____.

_____ Submission not in compliance with instructions. Respond to attached comments and resubmit.

_____ Proposed equal product not acceptable. Use specified products.

_____ Not Reviewed. Submission received too late. Use specified products.

ADDITIONAL COMMENTS:

BY: _____ **DATE:** _____

BID FORM

FOR GENERAL CONTRACT WORK (U.S.)

PROJECT IDENTIFICATION:

5021847-19020101 - Huntsville 1, 2, South Fork

OWNER:

Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner")

ARCHITECT:

McNeil Group Inc.

BID

1. In submitting this Bid, Bidder represents that:
   a. If this Bid is accepted, Bidder will enter into an agreement with Owner to perform and furnish the Work described in the Bidding Documents for the Bid Price and within the Time of Substantial Completion indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
   b. Bidder has carefully examined Set(s) Number _____ of the Bidding Documents consisting of the Project Manual containing the Bidding Requirements, the Conditions of the Contract, and the Specifications, entitled _____, the Drawings entitled _____ and dated _____, and including sheets numbered _____, and addenda numbers _____.
   c. Bidder has examined the site of the work, existing conditions, and all other conditions affecting the work on the above-named Project.
   d. Bidder has carefully correlated the information known to Bidder and information and observations obtained from visits to the site with the Bidding Documents.
   e. Bidder is familiar with federal, State, and local laws and regulations applicable to Project.
   f. Bidder guarantees there will be no revisions or withdrawal of bid amount for forty-five (45) days after the bid opening.

2. Bidder hereby proposes to furnish all materials, labor, equipment, tools, transportations, services, licenses, fees, permits, etc., required by said documents to complete the Work described by the Contract Documents for the lump-sum of: _____ Dollars ($ _____).

3. Bidder agrees to achieve substantial completion of the Work within the number of days indicated in the Invitation to Bid.

4. Enclosed is a Bid Bond for not less than five percent (5%) of the bid.

RESPECTFULLY SUBMITTED:

_____
Signature

_____
Printed name

_____
Title

_____
Company name

_____
Business Address

_____ _____
Date City, State, and Zip Code

_____ _____
License No. Telephone Fax

_____
Contact Email Address

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
CORPORATION OF THE PRESIDING BISHOP OF
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

Building Name: Huntsville 1, 2, South Fork

Building Plan Type:

Building Address: 277 South 7400 East, Huntsville Utah 84317

Building Owner: Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.

Project Number: 5021847-19020101

Completion Date:

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

Project Consultant and Principal in Charge (signature) Date

McNeil Group Inc.
Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

General Contractor (signature) Date

Company Name

INTRODUCTORY INFORMATION

B L A N K P A G E

AGREEMENT BETWEEN OWNER AND CONTRACTOR
FOR A FIXED SUM (U.S.)

Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole, ("Owner") and _____ ("Contractor") hereby enter into this *Agreement Between Owner and Contractor for a Fixed Sum (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

   Property/Project Number:
   Property Address ("Project Site"):
   Project Type:
   Project Name ("Project"):
   Stake Name:

2. **Scope of the Work.** Contractor will furnish all labor, materials, equipment, construction, and services necessary to complete the Work in accordance with the Contract Documents.

3. **Contract Documents.**
   a. The Contract Documents consist of:
      1) This Agreement;
      2) The General Conditions for a Fixed Sum (U.S.), the Supplementary Conditions for a Fixed Sum (U.S.), and the Specifications (Divisions 01 through 49) contained in the Project Manual entitled _____, dated _____ and prepared by _____ ("Architect");
      3) The Drawings prepared by Architect entitled _____, sheet numbers _____, dated _____;
      4) Addendum No. _____ dated _____; and
      5) All Modifications to the Contract Documents.
   b. The Contract Documents are incorporated into this Agreement by reference as if fully set forth herein.
   c. The definitions set forth in the General Conditions for a Fixed Sum (U.S.) will apply to the Contract Documents.
   d. The Contract Documents contain the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.
   e. Modifications or other amendments to the Contract Documents must be in writing and as provided in the General Conditions for a Fixed Sum (U.S.).

4. **Time of Commencement and Substantial Completion.**
   a. Contractor will commence the Work on the date for commencement set forth in the Written Notice to proceed from Owner to Contractor.
   b. Contractor will achieve Substantial Completion and have the Work ready for Owner's inspection no later than _____ (_____) days from the date of commencement set forth in the Written Notice to proceed from Owner to Contractor, as adjusted in accordance with the Contract Documents.
   c. Time is of the essence.

5. **Contract Sum.**
   a. Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the Contract Sum in the amount of _____ Dollars ($_____), subject to additions and deductions as provided in the Contract Documents.
   b. Owner will make payments to Contractor in accordance with the Contract Documents.

6. **Independent Contractor Relationship.** Contractor is an independent contractor and is not the agent or employee of Owner.

7. **Assignment.** Neither party to this Agreement will assign any right or obligation hereunder without the prior written consent of the other, which consent may be granted or withheld in such party's absolute discretion. Contractor will not assign moneys due or to become due to Contractor hereunder, nor will Contractor pledge the credit of Owner or bind Owner to any third party.

8. **Notice.** The parties designate the addresses, facsimile numbers, and email addresses as set forth in the signature blocks below to be used for sending Written Notice to the other party:

9. **Effective Date.** The effective date of this Agreement is the date indicated by the Owner's signature.

OWNER:	**CONTRACTOR:**
Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.	(company)
Signature:	Signature:
Print Name:	Print Name:
Title:	Title:
Address:	Address:
Telephone No:	Telephone No:
Facsimile No:	Facsimile No:
Email:	Email:
Effective Date:	Fed. I.D. or SSN:
	License No:
Reviewed By:	Date Signed:

GENERAL CONDITIONS
For a Fixed Sum (U.S.)

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SECTION 1 - GENERAL PROVISIONS

1.1 DEFINITIONS

A. Adverse Weather: weather conditions that are seasonally abnormal and could not have been reasonably anticipated.

B. Agreement: the document entitled "Agreement Between Owner and Contractor for a Fixed Sum (U.S.), executed by Owner and Contractor for performance of the Work.

C. Architect: the entity identified as such in the Agreement.

D. Change In The Work: a modification to the requirements of the Contract Documents or a delay in Substantial Completion resulting from an instruction from Owner or Architect to Contractor or from another event or circumstance.

E. Change Order: a written instrument prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement upon the following: (1) the occurrence of a Change in the Work; (2) the amount of the adjustment, if any, in the Contract Sum as a result of the Change in the Work; and (3) the extent of the adjustment, if any, in the Contract Time as a result of the Change in the Work.

F. Construction Change Directive: a written order prepared by Architect and signed by Architect and Owner which: (1) orders a Change in the Work if the terms of a Change Order cannot be agreed upon prior to performance of a Change in the Work described in Section 7.1 or after occurrence of an event or circumstance described in Section 7.2; and (2) states a proposed basis for adjustment, if any, in the Contract Sum, the Contract Time, or both, resulting from the Change in the Work.

G. Contract Documents: the documents identified as such in the Agreement.

H. Contract Sum: the total amount set forth in the Agreement payable by Owner to Contractor for performance of the Work.

I. Contract Time: the period of time set forth in the Agreement for the Substantial Completion of the Work.

J. Contractor: the entity identified as such in the Agreement.

K. Day: calendar day unless otherwise specifically defined.

L. Direct Costs: actual costs for labor, materials, equipment, insurance, bonds, subcontract costs and onsite supervision relating to the Project. They do not include labor costs for project managers or other off-site administration.

M. Drawings: the documents identified as such in the Agreement.

N. Field Change: a written order prepared by Architect and signed by Architect and Contractor for a minor Change in the Work consistent with the general intent of the Contract Documents costing $1,000 or less, resulting in no time extension, and which is necessary to avoid delaying the Work.

O. Modification: a written amendment to the Contract Documents in the form of a:
1. Change Order;
2. Construction Change Directive; or
3. Field Change.

P. Owner: the entity identified as such in the Agreement.

Q. Project: the total construction designed by Architect of which the Work performed under the Contract Documents may be the whole or a part.

R. Product Data: standard illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate details regarding materials or equipment to be used in the Work, or the manner of installation, operation, or maintenance of such materials or equipment.

S. Project Manual: the document identified as such in the Agreement.

T. Samples And Mock-ups: physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

U. Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, fabrication and installation drawings, setting diagrams, patterns, templates, and other data which illustrate some portion of the Work and confirm dimensions and conformance to the Contract Documents specially prepared by Contractor or any Subcontractor, manufacturer, supplier, or distributor.

V. Specifications: the documents identified as such in the Agreement.

W. Subcontractor: any entity supplying labor, materials, equipment, construction or services for the Work under separate contract with Contractor or any other Subcontractor.

X, Submittals: Shop Drawings, Product Data, Samples and Mock-ups and any other documents or items furnished by Contractor or its Subcontractors to Owner or Architect to demonstrate how any portion of the Work will be accomplished or the type of materials or products that will be used in the Work.

Y. Substantial Completion: Completion of the Work to a point where Owner can use the Work for its intended purposes. The date of Substantial Completion is the date certified as such by Architect in accordance with the Contract Documents.

Z. Work: all labor, materials, equipment, construction, and services required by the Contract Documents.

AA. Written Notice: notice in writing given from one party to the other at the addresses or facsimile numbers listed in the Agreement, or at such other addresses or facsimile numbers as the parties will designate from time to time by Written Notice, and will be effective at the earliest of:
1. The date of personal delivery to the other party with signed acknowledgment of receipt; or
2. The date sent by facsimile transmission to the other party provided receipt of the facsimile is verified by an electronic confirmation report by the party sending the facsimile transmission and further provided that a confirmation copy is sent to the other party by courier or by registered or certified mail within twenty-four (24) hours after the time and date of the facsimile transmission; or
3. The date of receipt by the other party as stated on the return receipt if sent by registered or certified mail, or by courier.

1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

A. The intent of the Contract Documents is to require Contractor to provide all labor, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.

B. The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.

C. Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.

D. In the interest of brevity, the Contract Documents may 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.

1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

The Drawings, the Project Manual, and copies thereof are the property of Owner. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

1.4 PUBLIC STATEMENTS REGARDING PROJECT

Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the Work or at completion, are the property of the Owner. The Owner reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs shall be used or distributed without written consent of the Owner

1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP

Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, Sub-subcontractors or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:

A. By referring to this Agreement, Owner, or the Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;

B. By using or allowing the use of any photographs of the Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner in connection with any service or product; or

C. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Project.

Notwithstanding the foregoing, Contractor may include a reference to Owner and the services and equipment provided under this Agreement in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance; provided, that such reference to Owner, the services and equipment is included with at least several other similar references and is given no more prominence than such other references.

1.7 CONFIDENTIALITY / PROPERTY RIGHTS

A. Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor for or relative to Work performed under this Agreement, such products, services, and Work of Contractor constituting works made for hire. Contractor will not reuse any portions of such items provided by Owner or developed by Contractor for Owner pursuant to this Agreement, or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its' absolute discretion.

B. In addition, Contractor shall ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
   1. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
   2. Any information relating to contracts, agreements, business plans, budgets or other financial information of Owner to the extent such information has not been made available to the public by the Owner; and
   3. Any other information that is marked or noted as confidential by the Owner at the time of its disclosure.

1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS

Contractor represents and warrants that no Work (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

SECTION 2 - OWNER

2.1 OWNER'S DESIGNATED REPRESENTATIVE

Owner will designate in writing a representative who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

2.2 INFORMATION AND SERVICES REQUIRED OF OWNER

A. Owner will be responsible for establishment of property lines and benchmarks for grading.

B. Owner will furnish to Contractor any information or services it is required to furnish under the Contract Documents with reasonable promptness to avoid delay in the orderly progress of the Work.

C. Owner will furnish to Contractor a reasonable number of copies of the Drawings, the Project Manual, and the Addenda.

2.3 OWNER'S RIGHT TO INSPECT THE WORK

Owner and its representatives will have the right to inspect any portion of the Work wherever located at any time.

2.4 OWNER'S RIGHT TO STOP THE WORK

If Contractor fails to carry out the Work in accordance with the Contract Documents or fails to correct Work which is not in accordance with the Contract Documents in a timely manner, Owner may order Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated.

SECTION 3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

A. By executing the Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.

B. Contractor will carefully review and compare the Contract Documents and any other available information relating to the Project prior to commencing and during performance of each portion of the Work and will immediately report to Architect any errors, inconsistencies, and omissions it discovers.

C. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents prior to commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Architect before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Architect. If neither Contractor nor its Subcontractors become aware of the question until after work on the relevant portion of the Work has commenced, then the following precedence will govern for purposes of determining whether resolution of the question constitutes a Change in the Work:
   1. The Agreement takes precedence over all other Contract Documents.
   2. The Supplementary Conditions take precedence over the General Conditions.
   3. The General Conditions and Supplementary Conditions take precedence over the Drawings and the Specifications.
   4. An Addendum or a Modification takes precedence over the document(s) modified by the Addendum or Modification.
   5. The Specifications take precedence over the Drawings.
   6. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.

D. Contractor will give Architect notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.

E. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Architect in writing. Contractor will not proceed unless Owner and/or Architect effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Owner against loss and bear all costs and penalties arising therefrom.

F. Contractor will take field measurements and verify field conditions and will compare such field measurements and conditions and other information known to Contractor with the Contract Documents before ordering any materials or commencing construction activities. Contractor will immediately report errors, inconsistencies, and omissions that it discovers to Architect. If Contractor orders materials or commences construction activities before taking field measurements and verifying field conditions, Contractor will not be entitled to any compensation for additional costs to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions prior to ordering the materials or commencing construction activities.

G. If site conditions indicated in the Contract Documents or other information provided by Owner or Architect to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Architect in writing of such differing site conditions.

H. Where the Contract Documents require the Contractor to provide professional services for architecture or engineering, the Contractor shall cause such services to be performed by appropriately licensed professionals.

3.2 SUPERVISION OF CONSTRUCTION PROCEDURES

A. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work. All loss, damage, liability, or cost of correcting defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Owner has then instructed Contractor in writing to proceed at Owner’s risk.

B. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Owner.

C. Contractor will be responsible for:
   1. The proper observance of property lines and set back requirements as shown in the Contract Documents;

2. The location and layout of the Work as shown in the Contract Documents with respect to the position of the Work on the property and the elevation of the Work in relation to grade; and
3. Setting and maintaining construction stakes.

D. Contractor will be responsible to Owner for the acts and omissions of its employees and Subcontractors as well as persons either directly or indirectly employed by Subcontractors.

E. Contractor will not be relieved of its obligation to perform the Work in accordance with the Contract Documents as a result of any tests, inspections, or approvals by Owner, Architect or their consultants.

F. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.

G. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Owner's image and function and will maintain the premises free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor shall promptly remove construction equipment, tools, surplus materials, waste materials and debris.

3.3 LABOR AND MATERIALS

A. Unless otherwise provided in the Contract Documents, Contractor will provide and pay for all labor, materials, equipment, tools, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

B. Contractor will at all times enforce strict discipline and good order among those performing the Work and will not permit employment of any unfit person or anyone not skilled in the tasks assigned to them.

C. Contractor is fully responsible for the Project and all materials and work connected therewith until Owner has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from the Owner.

D. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.

E. Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. Architect may require Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the work meets the requirements of the Contract Documents. All such data will be furnished at Contractor's expense. This provision will not require Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at Contractor's expense.

F. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Owner, reasonable opportunity for the installation of Work and the storage of materials.

G. Contractor warrants to Owner that the materials and equipment furnished for the Work will be new unless otherwise specified by the Contract Documents, and that the Work will be free from defects, and will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the discretion of Owner. If required by Architect, Contractor will furnish satisfactory evidence as to the kind and quality of the materials and equipment used in performing the Work.

H. Owner may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.

3.4 COMPLIANCE WITH LAWS

Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public authorities relating to performance of the Work.

3.5 TAXES

A. Contractor will pay all sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work.

B. Owner will pay all taxes and assessments on the real property comprising the Project site.

3.6 PERMITS AND FEES

A. Owner will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.

B. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.

C. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to Architect prior to issuance of the Certificate of Substantial Completion by Architect.

3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE

Contractor will employ a competent representative acceptable to Owner to supervise the performance of the Work. This representative will be designated in writing by Contractor prior to commencement of work and will not be changed prior to final inspection of the Work without prior written consent of Owner. This representative will represent Contractor for all purposes, including communication with Owner.

3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES

A. Contractor will prepare and submit for Owner's and Architect's information Contractor's construction schedule for the Work in accordance with the requirements of the Contract Documents.

B. Contractor will prepare and maintain a Submittal schedule which is coordinated with Contractor's construction schedule and sets forth specified times for Architect to review Submittals.

3.9 DOCUMENTS AND SUBMITTALS AT THE SITE

Contractor will keep at the Project site for use by Owner, Architect, or their representatives, a record copy of the Project Manual, the Drawings, all Addenda, and all Modifications. These documents will be maintained in good order and currently marked to record changes and selections made during construction. In addition, Contractor will keep at the Project site one copy of all Submittals.

3.10 SUBMITTALS

A. Submittals are not Contract Documents and do not alter the requirements of the Contract Documents unless incorporated into the Contract Documents by a Modification.

B. Contractor will review, approve, and submit to Architect Submittals in accordance with the Contract Documents. By approving Submittals, Contractor represents that it has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that it has checked and coordinated each Submittal with the requirements of the Work and of the Contract Documents or will make such determination, verification, check, and coordination prior to commencing the relevant portion of the Work. In reviewing Submittals Architect will be entitled to rely upon Contractor’s representation that such information is correct and accurate.

C. Contractor will inform Architect in writing at the time of submission of any Submittal or portion thereof which deviates from the requirements of the Contract Documents. Contractor will provide Architect with documentation demonstrating to Architect that the Submittal is equal to or better than the specified product or work. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by Architect’s acceptance of a Submittal unless Contractor has informed Architect in writing of the deviation and Architect has incorporated the deviation into the Contract Documents by a Modification.

D. Contractor will not perform any portions of the Work requiring Submittals until the respective Submittal has been reviewed and accepted in writing by Architect.

E. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Owner will be entitled to rely upon such certifications, and neither Owner nor Architect will be expected to make any independent examination with respect thereto.

F. Submittals not required by the Contract Documents may be returned to Contractor without action.

3.11 CUTTING AND PATCHING

Contractor will be responsible for any cutting, fitting, and patching that may be required to complete the Work and make its parts fit together properly.

3.12 ACCESS TO WORK

Contractor will permit Owner, Architect, their representatives and consultants, access to the Work wherever located at any time.

3.13 ROYALTIES AND PATENTS

Contractor will pay all royalties and license fees required by the Work or by Contractor's chosen method of performing the Work. Contractor will defend and hold Owner harmless from all suits or claims for infringement of any patent, license or other intellectual property rights or any loss on account thereof.

3.14 INDEMNIFICATION

A. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively “Claims” or “Claim”), including but not limited to attorney fees, consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of the Work, attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner’s property, except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.

B. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Owner with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.

C. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.

D. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or a Subcontractor under worker's compensation acts, disability benefit acts, or other employee benefit acts.

3.15 PROJECT MEETINGS

Contractor will attend and participate in meetings as required by the Contract Documents.

SECTION 4 - ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

In the event that Owner terminates its contractual relationship with Architect, Owner will appoint in writing another architect, whose status under the Contract Documents will be that of the former Architect in all respects.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

A. Architect will make periodic visits to the site to familiarize itself generally with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. Although Architect is required to make periodic inspections, it is not required to make exhaustive or continuous onsite inspections. On the basis of its observations while at the site, Architect will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. Architect’s failure to observe a defect or deficiency in the Work will not relieve Contractor of its duty to perform the Work in accordance with the Contract Documents.

B. Architect will review Contractor's payment requests and determine the amounts due Contractor in accordance with Section 9.

C. Communications between Contractor and Owner relating to the Work will be through Architect. Communications between Owner or Contractor with Architect’s consultants relating to the Work will be through Architect. Communications between Owner or Architect and subcontractors relating to the Work will be through Contractor. Communications between Contractor and any separate contractor will be through Architect, except as otherwise specified in the Contract Documents.

D. Owner and/or Architect will have the right to reject and require removal of the following at Contractor's expense:
   1. Any portion of the Work that does not meet the requirements of the Contract Documents.
   2. Any portion of the Work damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.

E. Architect will have authority to suspend the Work, with concurrence of Owner, whenever such suspension may be necessary in its reasonable opinion to insure the proper performance of the Work.

F. Architect will review Contractor’s Submittals and will accept or take other appropriate action regarding the Submittals. Architect's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of 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 Contractor. Architect's review of Submittals will not relieve Contractor of its obligations under the Contract Documents. Architect's review of Submittals will not constitute acceptance of safety precautions or construction

means, methods, techniques, sequences or procedures. Architect's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.

G. Architect has authority to order Construction Change Directives and Field Changes in accordance with Section 7.

H. Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by Contractor, and will review and certify or reject Contractor's final payment request.

I. Architect will be the interpreter of the performance and requirements of the Contract Documents. Architect's interpretations will be in writing or in the form of drawings.

J. Architect's decisions in matters relating to aesthetic effect will be final if consistent with the Contract Documents and approved by Owner.

SECTION 5 - SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK

A. Contractor will enter into contracts with Subcontractors to perform all portions of the Work that Contractor does not customarily perform with its own employees.

B. Contractor will not contract with any Subcontractor who has been rejected by Owner. Contractor will not be required to contract with any Subcontractor against whom it has a reasonable objection.

C. If Owner rejects any Subcontractor proposed by Contractor, Contractor will propose an acceptable substitute to whom Owner has no reasonable objection.

D. Contractor will not make any substitution for any Subcontractor that has been accepted by Owner and Architect without the prior written approval of Owner and Architect.

5.2 SUBCONTRACTUAL RELATIONS

A. Contractor's responsibility for the Work includes the labor and materials of all Subcontractors, including those recommended or approved by Owner. Contractor will be responsible to Owner for proper completion and guarantee of all workmanship and materials under any subcontracts. Any warranties required for such work will be obtained by Contractor in favor of Owner and delivered to Architect. It is expressly understood and agreed that there is no contractual relationship between Owner and any Subcontractor, and under no circumstances will Owner be responsible for the non-performance or financial failure of any Subcontractor or any effects therefrom.

B. Contractor agrees to pay the Subcontractors promptly upon receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which Owner has made payment.

C. Contractor will require each Subcontractor to:
1. Be licensed by the state in which the Project is located where such licensing is required by the governing authority;
2. Be bound by the terms of the Contract Documents as far as they are applicable to the Subcontractor's work;
3. Assume toward Contractor the same obligations Contractor has assumed toward Owner, including the prompt payment of its Subcontractors;
4. Submit its applications for payment to Contractor in time to permit Contractor to make timely application to Owner;
5. Execute claim or lien releases or lien waivers for payments made by Contractor; and
6. Make all claims for Changes in the Work to Contractor in the same manner as Contractor is required to make such claims to Owner.

SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK OR AWARD SEPARATE CONTRACTS

A. Owner reserves the right to perform work itself or to award separate contracts in connection with the Project.

B. When separate contracts are awarded, "Contractor" in the Contract Documents in each case will mean the contractor who signs each separate contract.

6.2 MUTUAL RESPONSIBILITY

A. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its Work with theirs where applicable.

B. If any part of Contractor's Work depends upon the work of any separate contractor for proper performance or results, Contractor will inspect and promptly report to Architect any apparent discrepancies or defects in such work that render it unsuitable for

proper performance and results. Failure of Contractor to so inspect and report will constitute an acceptance of the work of the separate contractor as fit and proper to receive Contractor's Work, except as to defects not then reasonably discoverable.

C. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to the completed or partially completed work of other contractors or to the property of Owner or other contractors.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Owner may clean the Project, allocate the cost among those responsible as Owner and Architect determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

SECTION 7 - CHANGES IN THE WORK

7.1 CHANGES IN THE WORK RESULTING FROM AN INSTRUCTION BY OWNER OR ARCHITECT TO CONTRACTOR

A. If Owner or Architect gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1, Paragraphs B through G. If compliance with the instruction delays Substantial Completion, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1, Paragraphs B through G and Section 7.3, Paragraph A and Contractor will be paid liquidated damages for the delay as set forth in Section 7.3, Paragraph B.

B. If Contractor receives an instruction from Owner or Architect that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify Architect in writing that Contractor considers such instruction to constitute a Change in the Work. If Architect agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1, Paragraphs C. and D. within ten (10) days.

C. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Owner. The breakdown will be in sufficient detail to allow Owner to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor’s profit and overhead charges. Profit and overhead will be subject to the following limitations:
   1. The Subcontractor’s profit and overhead will not exceed ten (10) percent of its Direct Costs on work performed. Subcontractor’s profit and overhead will not exceed five (5) percent on work performed by its sub-subcontractors.
   2. Contractor's profit and overhead on work performed by its own crews will not exceed ten (10) percent of its Direct Costs.
   3. Contractor's profit and overhead mark up on work performed by its Subcontractors will not exceed five (5) percent of the Subcontractors’ charges for such work.
   4. Amounts due Owner as a result of a credit change will be the actual net savings to Contractor from the Change in the Work as confirmed by Architect. On credit changes, profit and overhead on the originally estimated work will not be credited back to Owner. If both additions and credits are involved in a single Change in the Work, overhead and profit will be figured on the basis of net increase, if any, related to that Change in the Work.

D. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Owner or Architect, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Completion.

E. Upon receipt of Contractor’s proposal for Modification, Architect and Owner will determine whether to proceed with the Change in the Work. If Architect and Owner determine to proceed with the Change in the Work, they will issue a Change Order, a Construction Change Directive or a Field Change as appropriate.

F. Contractor agrees that if it complies with an instruction from Owner or Architect without first giving written notice to Architect as provided in Section 7.1., Paragraph B, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.

G. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Owner and Architect do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 13 within thirty (30) days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.

H. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Owner will have the right to examine the Contractor’s records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE

A. If an event or circumstance other than an instruction from Owner or Architect affects the cost to Contractor of performing the Work or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Owner or Architect, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.2, Paragraphs B through F. If the event or circumstance delays Substantial Completion and is described in Section 7.3, Paragraph A, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Completion and is caused by a willful or negligent act or omission of Owner or Architect, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.3, Paragraph B. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Owner as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Owner or Architect.

B. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will give Owner Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Owner can take such action as is necessary to mitigate the effect of the event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Owner.

C. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Owner due to the circumstance or event and waives any claim therefor.
   1. Claims for an adjustment in the Contract Time due to Adverse Weather will be made by the tenth (10th) of the month following the month in which the delay occurred.
   2. Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) days after the occurrence of the circumstance or event.

D. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1, Paragraph C. Any amount claimed for increased labor costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.

E. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Completion. If Contractor is entitled to an adjustment in the Contract Time as a result of an event or circumstance caused by the wilful or negligent act or omission of Owner or Architect, Contractor will be compensated for all costs related to the delay in accordance with Section 7.3, Paragraph B.

F. Within thirty (30) days after receipt of Contractor's claim, Architect will either deny the claim or recommend approval to Owner. If Owner approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.5 or a Construction Change Directive pursuant to Section 7.6. If Owner or Architect denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 13 within thirty (30) days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 13 within the thirty (30) day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/ or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

7.3 EXTENSIONS OF TIME

A. If Substantial Completion of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Change Order for a period of time equal to such delay:
   1. Labor strikes or lock-outs;
   2. Adverse weather;
   3. Unusual delay in transportation;
   4. Unforeseen governmental requests or requirements;
   5. A Change in the Work resulting from an instruction by Owner or Architect to Contractor subject to the conditions set forth in Section 7.1; or
   6. Any other event or circumstance caused by the willful or negligent act or omission of Owner or Architect.

B. Contractor will not be entitled to any compensation for delay described in Section 7.3, Paragraph A, subparagraphs 1, 2, 3 and 4. For each day of delay in Substantial Completion described in Section 7.3, Paragraph A, subparagraphs 5 and 6, Contractor will be paid liquidated damages in the amount per day set forth in the Supplementary Conditions to compensate Contractor for all damages resulting from any delay including but not limited to damages for general conditions costs, additional job site costs, additional home office overhead costs, disruption costs, acceleration costs, increase in labor costs, increase in subcontract costs, increase in materials costs, and any other costs incident to the delay. Contractor will be entitled to no other compensation relating to the delay.

C. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.

7.4 DOCUMENTATION OF CHANGES IN THE WORK

Every Change in the Work will be documented by a Change Order, a Construction Change Directive or a Field Change. If Owner, Architect and Contractor reach agreement regarding the adjustment in the Contract Sum, if any, and the adjustment in the Contract Time, if any, resulting from a Change in the Work, then the parties will execute a Change Order pursuant to Section 7.5. If Owner, Architect and Contractor cannot reach agreement regarding the adjustment in Contract Sum or the adjustment in Contract Time resulting from a Change in the Work, then Owner and Architect will issue a Construction Change Directive pursuant to Section 7.6. Field Changes require the agreement of Architect and Contractor only.

7.5 CHANGE ORDERS

Contractor's signature upon a Change Order is Contractor's acknowledgment that it is not entitled to any additional adjustment in the Contract Sum or the Contract Time or any other damages or compensation as a result of the Change in the Work other than that provided for in the Change Order, irrespective of whether a subsequent claim for additional compensation or time extensions relating to the Change in the Work is described as a change in the requirements of the Contract Documents, a delay, a disruption of the Work, an acceleration of the Work, an impact on the efficiency of performance of the Work, an equitable adjustment, or other claim and irrespective of whether the impact of the Change in the Work is considered singly or in conjunction with the impact of other Changes in the Work.

7.6 CONSTRUCTION CHANGE DIRECTIVES

A. Contractor will promptly comply with all Construction Change Directives.

B. Pending final resolution of any adjustment in the Contract Sum or Contract Time relating to a Construction Change Directive, the amounts proposed by Owner in the Construction Change Directive may be included in Contractor's payment requests once the work relating thereto is completed.

C. If after the work described in the Construction Change Directive is completed, Owner, Architect, and Contractor reach agreement on adjustments in the Contract Sum, Contract Time, or both, such agreement will be reflected in an appropriate Change Order.

D. If the parties do not reach agreement regarding an adjustment to the Contract Sum, Contract Time, or both relating to the Construction Change Directive within thirty (30) days of the completion of the work described therein, then Contractor may submit its claim for an adjustment pursuant to Section 13 within thirty (30) days of the completion of such work. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days of completion of the work described in the Construction Change Directive, then it will not be entitled to an adjustment in Contract Sum or Contract Time resulting from such work except as set forth in the Construction Change Directive and waives any claim therefor.

7.7 FIELD CHANGES

Architect and Contractor will sign a Field Change order listing the Change In The Work and the Contract Sum including markups before Contractor proceeds with the Field Change.

7.8 WAIVER OF CLAIMS

Except as set forth in Section 7, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time or for any damages of any kind whatsoever resulting from an instruction from Owner or Architect, any event or circumstance, or any act or omission of Owner or Architect and Contractor expressly waives any and all claims therefor.

SECTION 8 - TIME

8.1 TIME IS OF THE ESSENCE

All time limits stated in the Contract Documents are of the essence. By executing the Agreement, Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor will proceed expeditiously with adequate resources and will achieve Substantial Completion within the Contract Time.

8.2 COMMENCEMENT OF THE WORK

Contractor will not commence work on the Project site until the date set forth in the Written Notice to proceed. However, Contractor may enter into subcontracts and secure material for the Project after receipt of the Agreement with Owner's authorized signature. Owner will issue the Written Notice to proceed within forty-five (45) days after Owner receives acceptable bonds and evidence of insurance pursuant to Section 11 unless Owner earlier terminates the Agreement pursuant to Section 14.

8.3 DELAY IN COMPLETION OF THE WORK

A. For each day after the expiration of the Contract Time that Contractor has not achieved Substantial Completion, Contractor will pay Owner the amount set forth in the Supplementary Conditions as liquidated damages for Owner's loss of use of the Project

and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

B. At the time Architect certifies that Contractor has achieved Substantial Completion, Architect will identify the remaining items to be completed for final completion of the Work and will establish with Contractor a reasonable time for completion of those items. Architect will set forth the items to be completed and the time established for their completion in a Certificate of Substantial Completion. For each day that Contractor exceeds the time allowed for completion of the items set forth in the Certificate of Substantial Completion, Contractor will pay to Owner as liquidated damages for additional administrative expenses the amount set forth in the Supplementary Conditions. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay in completing such items.

SECTION 9 - PAYMENTS AND COMPLETION

9.1 SCHEDULE OF VALUES

Contractor will submit to Architect a schedule of values which allocates the Contract Sum to various portions of the Work. The schedule of values will be supported by such data to substantiate its accuracy as required by Architect. This schedule, when accepted by Owner and Architect, will be used as a basis for reviewing Contractor's payment requests.

9.2 PAYMENT REQUESTS

A. Not more than once a month, Contractor will submit a payment request to Architect for Work completed, materials stored on the site, and for materials stored offsite as of the date of the payment request. The amount of the payment request will be based upon the schedule of values and will be equal to the value of the Work completed:
   1. Less retention;
   2. Less all prior amounts paid by Owner to Contractor as part of the Contract Sum; and
   3. Less allowable offsets.

   The payment request may include Changes in the Work that have been performed by Contractor and authorized by Owner and/or Architect pursuant to Section 7. If a payment request includes materials stored offsite, Contractor will include with the payment request a list of the materials, the location where they are stored and the written request of Contractor and its performance bond surety that payment be made for such materials.

B. Contractor warrants and guarantees that upon the receipt of payment for materials and equipment, whether incorporated in the Project or not, title to such materials and equipment will pass to Owner free and clear of all liens, claims, security interests, or encumbrances. Notwithstanding this payment and passage of title, Contractor will remain responsible for all such materials and equipment until actual delivery to the project site, incorporation into the Work, and final acceptance by Owner. Contractor further warrants that no material or equipment covered by a payment request is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or any other person or entity.

9.3 PAYMENT REQUEST CERTIFICATION

A. Architect will, within seven (7) days after receipt of Contractor's payment request, forward to Owner the payment request certified for such amount as Architect determines is properly due. If Architect certifies less than the full amount of the payment request, Architect will notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.

B. The certification of the payment request will constitute a representation by Architect to Owner based upon Architect's observations at the site and the data comprising the payment request, that the Work has progressed to the point indicated and that, to the best of Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. 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 minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by Architect. However, the certification of the payment request will not constitute a representation that Architect has:
   1. Conducted exhaustive or continuous on-site inspections to check the quantity or quality of the Work;
   2. Reviewed construction means, methods, techniques, sequences, or procedures;
   3. Reviewed copies of requisitions received from Subcontractors or other data requested by Owner to substantiate Contractor's right to payment; or
   4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

C. In taking action on Contractor’s payment request, Owner will be entitled to rely on the accuracy and completeness of the information furnished by Contractor.

9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT

A. Architect may withhold certification of a payment request in whole or in part to the extent reasonably necessary to protect Owner if, in the opinion of Architect, the representations to Owner required by Section 9.3, Paragraph B cannot be accurately made. If

Architect is unable to certify payment in the amount of the payment request, Architect will notify Contractor and Owner as provided in Section 9.3, Paragraph A. If Contractor and Architect cannot agree on a revised amount, Architect will promptly certify a payment request for the amount for which Architect is able to make such representations to Owner. Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a payment request previously certified, to such extent as may be necessary in Architect's opinion to protect Owner from loss because of:

1. Defective work not remedied;
2. Third-party claims filed or reasonable evidence indicating probable filing of such claims;
3. Failure of Contractor to make payments properly to Subcontractors for labor, materials, equipment, construction or services;
4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. Damage to Owner or another contractor for which Contractor is responsible;
6. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance will not be adequate to cover the cost of completing the Work and damages for the anticipated delay; or
7. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.

B. Owner reserves the right to withhold payments to Contractor, subsequent to Architect's certification of any payment request, in order to protect Owner from loss due to any condition described in Section 9.4, Paragraph A, Subparagraphs 1 through 7. Upon satisfactory resolution of any such conditions, payments so withheld will be made.

9.5 PROGRESS PAYMENTS

A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after Owner receives the certified payment request from Architect.

B. Owner will make payments to Contractor by either placing the payments in the mail addressed to Contractor or by electronic transfer at Owner’s discretion.

C. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.

D. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.

E. No payment made under the Contract Documents, either in whole or in part, will be construed to be an acceptance of defective or improper materials or workmanship.

F. In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor.

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner’s form entitled “Contractor’s Substantial Completion Affidavit and Consent of Surety” fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

9.6 FINAL PAYMENT

A. Owner will make full and final payment of the Contract Sum within thirty (30) days of the completion of all of the following requirements:

1. Contractor has submitted its final payment request;
2. Architect has declared to Owner in writing that the Work is complete;
3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor’s final payment request; and
4. Contractor has collected and provided to Owner all manufacturers’ and other guaranties and warranties, properly signed and endorsed to Owner, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents.).

B. Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made in writing pursuant to Section 7 and identified by Contractor in its affidavit as still pending.

C. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

SECTION 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Contractor will be responsible to Owner for initiating and supervising all safety programs in connection with the performance of the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

A. Contractor will take reasonable precautions to prevent damage, injury, or loss to:

1. All persons on the site;
2. The Work and materials and equipment to be incorporated into the Work; and
3. Other property at the site or adjacent to it.

B. Contractor will give notices and comply with applicable laws, ordinances, rules, regulations, and other lawful requirements of public authorities bearing on the safety or protection of persons and property. No work will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.

C. Contractor will designate a responsible member of its organization at the site whose duty will be the prevention of accidents. This person will be Contractor's onsite representative unless otherwise designated in writing by Contractor to Owner and Architect.

10.3 EMERGENCIES

In case of an emergency endangering life or threatening the safety of any person or property, Contractor may, without waiting for specific authorization from Architect or Owner, act at its own discretion to safeguard persons or property. Contractor will immediately notify Architect of such emergency action and make a full written report to Architect within five (5) days after the event.

10.4 HAZARDOUS MATERIALS

In the event the Contractor encounters on the site material reasonably believed to be hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected area shall be resumed in the absence of hazardous materials, or when it has been rendered harmless, by written agreement of the Owner and Contractor.

SECTION 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
   1. Workers Compensation Insurance.
   2. Employers Liability Insurance with minimum limits of the greater of $500,000 E.L. each accident, $500,000 E. L. disease-each employee, $500,000 E.L. disease-policy limit or as required by the law of the state in which the Project is located.

   3. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
      a. Limits of the greater of Contractor's actual coverage amounts or the following:
         1) $2,000,000 General Aggregate;
         2) $2,000,000 Products - Comp/Ops Aggregate:
         3) $1,000,000 Personal and Advertising Liability:
         4) $1,000,000 Each Occurrence;
         5) $50,000 Fire Damage to Rented Premises (Each Occurrence).
      b. Endorsements attached to the General Liability policy including the following or their equivalent:
         1) ISO Form CG 25 03 (05/09), Amendment of Limits of Insurance (Designated Project or Premises), describing the Agreement and specifying limits as shown above.
         2) ISO Form CG 20 10 (07/04), Additional Insured -- Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.
   4. Automobile Liability Insurance, with:
      a. Combined Single Limit each accident in the amount of $1,000,000 or Contractor's actual coverage, whichever is greater; and
      b. Coverage applying to "Any Auto."

B. Contractor will provide evidence of such insurance to Owner as follows:
   1. Deliver to Owner a Certificate of Liability Insurance, on ACORD 25 (2010/05) Form, or equivalent:
      a. Listing Owner and its consultants as the Certificate Holders and Additional Insured on the general liability and any excess liability policies;
      b. Attaching the ISO or equivalent endorsements set forth above to the Certificate of Liability Insurance;
      c. Identifying the Project;
      d. Listing the insurance companies providing coverage (All companies listed must be rated in A.M. Best Company Key Rating Guide-Property-Casualty and each company must have a rating of B+ Class VII or better. Companies which are not rated are not acceptable); and
      e. Bearing the name, address and telephone number of the producer and signed by an authorized representative of the producer. The signature may be original, stamped, or electronic.

C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:
   1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs; and
   2. All other insurance through Final Payment.

D. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.

E. Owner may, in writing and at its sole discretion, modify the insurance requirements.

F. The cost of insurance as required above will be the obligation of Contractor. Contractor will be responsible for payment of all deductible amounts under all insurance.

G. Owner will provide builders risk insurance for the cost of the Project. The policy will be written on an all risk basis with coverage for perils of wind, flood, earthquake, and terrorism, with exclusions standard for the insurance industry. The policy will be subject to a $5,000 deductible per occurrence which will be the responsibility of Contractor and will not be a reimbursable expense. Owner will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor's request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. In addition, when there is a loss which may be covered by the builders risk insurance policy, Contractor will comply with the following:
   1. Contractor will report the loss immediately to builders risk commercial insurer by calling 1-866-537-7475 and shall make such further written submissions as required and otherwise comply with all requirements of the builders risk policy.
   2. Contractor will report the loss immediately to the Owner.
   3. Contractor will immediately notify its general liability insurance carrier of the loss.
   4. Contractor will take all necessary and appropriate actions to protect the property and individuals from further loss, harm, and injury. In the event there are damages resulting from fire or water, restoration shall be performed only by a certified restoration contractor.
   5. To the extent possible, Contractor will preserve and not disturb the evidence of the loss until after the builders risk commercial insurer and all interested parties and their insurance carriers have had the opportunity to view and investigate the site and loss.
   6. Contractor will cooperate with Owner and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Owner.

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labor and material payment bond each in an amount equal to one hundred percent (100%) of the Contract Sum as security for all obligations arising under the Contract Documents. Such bonds will:
   1. Be written on Form AIA Document A312 (1984).
   2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
   3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".
   4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.

B. Owner reserves the right to reject any surety company, performance bond, or labor and material payment bond with or without cause.

C. The cost of the bonds as required above will be the obligation of Contractor.

SECTION 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

Contractor will notify Architect at least twenty-four (24) hours in advance of performing work that would cover up work or otherwise make it difficult to perform inspections required by the Specifications or by applicable governing authorities. Should any such work be covered without proper notification having been given to Architect, Contractor will uncover that work for inspection at its own expense.

12.2 CORRECTION OF WORK

A. Contractor will promptly correct any portion of the Work that is rejected by Architect or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for Architect's services, and any other expenses made necessary thereby.

B. Contractor will remedy any defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including without limitation additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses when incurred.

C. Nothing in the Contract Documents will be construed to establish a period of limitation within which Owner may enforce the obligation of Contractor to comply with the Contract Documents. The one-year period specified above has no relationship to the time within which compliance with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.

12.3 ACCEPTANCE OF NONCONFORMING WORK

A. If Owner prefers to accept any portion of the Work not in conformance with the Contract Documents, Owner may do so instead of requiring removal and correction of the nonconforming Work. In that event, the Contract Sum will be reduced by an amount agreed upon by the parties that reflects the difference in value to Owner between the Work as specified and the nonconforming Work. Such adjustment may consider increased maintenance costs, early replacement costs, increased inefficiency of use, and the like and will be effective whether or not final payment has been made. Such adjustment will be reflected in a Change Order pursuant to Section 7.5.

B. Temporary or trial usage by Owner or Architect of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents prior to written acceptance by Architect, will not constitute Owner's acceptance.

SECTION 13 - RESOLUTION OF DISPUTES

13.1 SUBMITTAL OF DISPUTE

In the event there is any dispute arising under this Agreement which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to the Director of Architecture, Engineering, and Construction, Meetinghouse Facilities Department, 50 East North Temple, Salt Lake City, Utah 84150, who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses.

13.2 CONTRACTOR TO PROCEED WITH DILIGENCE

Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under this Agreement.

SECTION 14 - TERMINATION

14.1 TERMINATION BY CONTRACTOR

In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate the Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor’s indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.2 TERMINATION BY OWNER FOR CAUSE

Should Contractor fail to provide Owner with the bonds and certificates of insurance required by Section 11 within the time specified therein, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor’s schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate the Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner’s sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor’s indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.3 TERMINATION BY OWNER FOR CONVENIENCE

Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate the Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the

percentage of the Contract Sum equal to the percentage of the Work which Architect determines has been completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

SECTION 15 - MISCELLANEOUS PROVISIONS

15.1 GOVERNING LAW

The parties acknowledge that the Contract Documents have substantial connections to the State of Utah. The Contract Documents will be deemed to have been made, executed, and delivered in Salt Lake City, Utah. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the State of Utah, excluding conflicts of law rules; and (ii) all disputes arising from or related to the Contract Documents will be decided only in a state or federal court located in Salt Lake City, Utah and not in any other court or state. Toward that end, the parties hereby consent to the jurisdiction of the state and federal courts located in Salt Lake City, Utah and waive any other venue to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

15.2 NO WAIVER

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

15.3 RULE OF CONSTRUCTION

Owner and Contractor agree that the Contract Documents will be deemed to have been drafted by both Owner and Contractor and will not be construed against either Owner or Contractor because of authorship.

15.4 ENFORCEMENT

In the event either party commences legal action to enforce or rescind any provision of the Contract Documents, the prevailing party will be entitled to recover its attorney fees and costs, including without limitation all copy costs and expert and consultant fees and expenses, incurred in that action and on all appeals, from the other party.

15.5 TESTS AND INSPECTIONS

A. Owner and Architect have the right to have tests made when they deem it necessary. Tests conducted by Owner or Architect will be paid for by Owner. Should a test reveal a failure of the Work to meet Contract Document requirements, the cost of the test as well as subsequent tests related to the failure necessary to determine compliance with the Contract Documents will be paid for by Owner, with the cost thereof deducted from the Contract Sum by Modification.

B. Tests will be made in accordance with recognized standards by a competent, independent testing laboratory. Materials found defective or not in conformity with Contract Document requirements will be promptly replaced or repaired at the expense of Contractor.

C. Owner and Architect have the right to obtain samples of materials to be used in the Work and to test samples for determining whether they meet Contract Document requirements. Samples required for testing will be furnished by Contractor and selected as directed by Architect. Samples may be required from the sample's source, point of manufacture, point of delivery, or point of installation at Architect's discretion. Samples not required as a Submittal in the Specifications will be paid for by Owner. Should tests reveal a failure of the Sample to meet the Contract Document requirements, Contractor will provide other Samples that comply with the requirements of the Contract Documents.

END OF DOCUMENT

SUPPLEMENTARY CONDITIONS
FIXED SUM (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Agreement and General Conditions apply to each Division of the Specifications.
2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGE AMOUNTS:

1. The amount of liquidated damages to the benefit of the Contractor for delays under General Conditions Section 7.3, Paragraph B is $350.00 per day.

2. The amount of liquidated damages to the benefit of the Owner for delays in Substantial Completion of the Work under General Conditions Section 8.3, Paragraph A is $350.00 per day.

3. The amount of liquidated damages to the benefit of the Owner for delays in completing work itemized on the Substantial Completion Certificate under General Conditions Section 8.3, Paragraph B is $350.00 per day.

ITEM 3 - PERMITS

1. Delete Section 3.6, Paragraph B of the General Conditions and replace with the following:

   B.

ITEM 4 - MISCELLANEOUS CHANGES IN GENERAL CONDITIONS

1. FOR PROJECTS EXCEEDING $5 MILLION – CONTRACTOR TO PROVIDE BUILDER'S RISK INSURANCE (AND NOT OWNER)

Replace Section 11.1 Contractor's Liability Insurance of the General Conditions with the following:

11.1 CONTRACTOR'S LIABILITY INSURANCE

A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
   1. Workers Compensation Insurance.
   2. Employers Liability Insurance with minimum limits of the greater of: $500,000 E.L. each accident, $500,000 E. L. disease-each employee, $500,000 E.L. disease-policy limit; or as required by the law of the state in which the Project is located.
   3. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
      a. Limits of the greater of Contractor's actual coverage amounts or the following:
         1) $2,000,000 General Aggregate;
         2) $2,000,000 Products - Comp/Ops Aggregate;
         3) $1,000,000 Personal and Advertising Injury;
         4) $1,000,000 Each Occurrence;
         5) $50,000 Damage to Rented Premises.
      b. Endorsements attached to the General Liability policy including the following or their equivalent:
         1) ISO Form CG 25 03 (05/09), Designated Construction Project(s) General Aggregate Limit, describing the project and specifying that limits apply to each project of the contractor.
         2) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization, naming Owner and Architect as additional insureds.
   4. Automobile Liability Insurance, with:

a. Combined Single Limit each accident in the amount of $1,000,000 or Contractor's actual coverage, whichever is greater; and
b. Coverage applying to "Any Auto" or equivalent to all owned autos, hired autos, and non-owned autos.

5. Builder's Risk Insurance Policy – ISO Form CP 00 20 (10/12), Builders Risk Coverage (or equivalent form) and ISO Form CP 10 30 (10/12) Causes of Loss – Special Form, and ISO Form CP 11 20 (06/07) Builders Risk – Collapse During Construction (or equivalent form) with Limits of Insurance in the amount of the Guaranteed Maximum Price.
   a. Policy will cover materials stored at temporary storage locations and materials in transit.
   b. Include Owner and Subcontractors as additional insureds.
   c. Policy will be subject to a deductible of not less than $5,000 per occurrence which will be the responsibility of Contractor and will not be included in the Cost of the Work or be a reimbursable expense.

B. Contractor will provide evidence of such insurance to Owner as follows:
   1. Deliver to Owner a Certificate of Insurance on ACORD 25 (2010/05) or equivalent:
      a. Listing Owner as the Certificate Holder and Owner and Architect as Additional Insureds on general liability and any excess liability policies;
      b. Attaching the endorsements set forth above for additional insured on general liability (CG 20 10 07/04) and Designated Construction Project Aggregate Limit (CG 25 03 05/09).
      c. Identifying the Project.
      d. Listing the insurance companies providing coverage. All companies must be rated in A.M. Best Company's Key Rating Guide – Property-Casualty, current edition, at a rating B+ Class VII or better. Companies that are not rated are not acceptable.
      e. Bearing the name, address, and telephone number of the producer and signed by an authorized representative of the producer. The signature may be original, stamped, or electronic. A faxed or digital copy is also acceptable.
   2. Deliver to Owner a Certificate of Insurance on ACORD 27, Evidence of Property Insurance, for the Builders Risk Insurance Policy attaching the endorsement giving evidence that the Owner and all Subcontractors are listed as additional insureds on the Builders Risk Policy.

C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:
   1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs;
   2. Builders' Risk Insurance through Substantial Completion; and
   3. All other insurance through final payment.

D. In the event of a loss, or upon request by Owner, Contractor will provide Owner with a copy of required insurance policies above.

E. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.

F. Owner may, in writing and at its sole discretion, modify the insurance requirements.

ITEM 5 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Utah

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN UTAH:

Replace section 9.5.F of the General Conditions with the following:

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor. These retention funds will be held in an interest bearing account.

PAYMENT OF RETAINED FUNDS IN UTAH:

Replace section 9.5 G of the General Conditions with the following:

G. After Contractor achieves Substantial Completion and submits its payment request for retained funds and delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, if any, and provides statutory Conditional Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days from the later of (a) the date Owner received Contractor's payment request for retained funds and fully executed Contractor's Substantial Completion Affidavit and Consent of Surety, (b) the date a certificate of occupancy is issued; (c) the date that a building inspector having authority to issue its own certificate of occupancy does not issue that certificate but permits occupancy.

UTAH STATE SALES TAX:

Add the following to the General Conditions:

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.

2. The Owner's tax exempt number is 11871701-002-STC.

UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:

Add the following to the General Conditions:

A. Contractor shall file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:
   1. The completion of performance time under the original contract for construction work is greater than 120 days;
   2. The total original construction contract price exceeds $500,000; and
   3. The original contractor or owner has not obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

UTAH NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the State Construction Registry, and copy to Owner, a notice of completion which shall include, without limitation, the following:
   1. The name, address, telephone number, and email address of the person filing the notice of completion;
   2. The name of the county in which the Project and/or Project site is located;
   3. The date on which final completion is alleged to have occurred;
   4. The method used to determine final completion; and
   5. One of the following:
      a. The tax parcel identification number of each parcel included in the Project and/or Project site;
      b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
      c. The entry number of the building permit issued for the Project.

B. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

UTAH PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace Section 9.5.A of the General Conditions with the following:

9.5 PROGRESS PAYMENTS

A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after:
   1. Contractor has submitted a progress payment request;
   2. Contractor has obtained Conditional Waiver and Release Upon Progress Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's progress payment request; and
   3. Owner receives the certified payment request from Architect.

Replace Section 9.6.A.3 of the General Conditions with the following:

9.6 FINAL PAYMENT

3. Contractor has obtained Waiver and Release Upon Final Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request;

END OF DOCUMENT

DIVISI0N 01: GENERAL REQUIREMENTS

END OF TABLE OF CONTENTS

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SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements Summary of Work requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.

B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 1200

MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Multiple Contracts.

1.2 SUMMARY OF CONTRACTS

A. Owner has issued or will issue separate contracts for operations scheduled to be completed between Notice to Proceed and Substantial Completion.
   1. General:
      a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 90 days in advance.
      b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
      c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
   2. Testing and Inspection. See Section 01 4523 “Testing and Inspection” for testing and inspection, and testing laboratory services for materials, products, and construction methods:
      a. Drill-In Mechanical Anchors / Adhesive Anchors / Screw Anchors. See Section 03 1511 and Section 04 0519.

B. Owner has issued or will issue separate contracts for operations normally scheduled to follow Substantial Completion.
   1. General:
      a. Give written notice to such contractors and to Owner of any revisions of scheduled date of Substantial Completion at least 90 days in advance. Contractor will be back charged for actual expenses incurred by Owner for failure to accurately report date of Substantial Completion.
      b. Complete work necessary to accommodate items provided under such separate contracts before Substantial Completion. Contractor will be back charged for actual expenses incurred by Owner for failure to complete such work before Substantial Completion.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 1400

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Work Restrictions.

1.2 PROJECT CONDITIONS

A. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
   1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
   2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
   3. Do not allow use of tobacco in any form on Project Site.
   4. Do not allow pornographic or other indecent materials on site.
   5. Do not allow work on Project site on Sundays except for emergency work.
   6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
   7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
   8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
   9. Do not build fires on Project Site.
   10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

B. Existing Facilities:
   1. Reasonably accommodate use of existing facilities by Owner.

C. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 2200

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Unit Prices.

1.2 UNIT PRICE MEASUREMENT

A. Unit prices listed by Contractor on Bid Form will be used to price changes to Contract Sum. Such unit prices include all labor, material, equipment, overhead, profit, and taxes.

B. Unit Price Measurement:
   1. Keep daily log of each Unit Price item which includes:
      a. A description of Unit Price Item.
      b. Quantity.
      c. Date.
      d. Time of Day with place for AM and PM.
      e. Signature of person preparing log.
   2. Submit copy of log to Architect with daily construction reports.

1.3 UNIT PRICE PAYMENT

A. Contract Sum will be adjusted by change order to reflect variance, if any, of actual quantities from amount included in base bid for each Unit Price.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 2900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements to prepare and process Applications for Payments.

1.2 PAYMENT REQUESTS

A. Use Payment Request forms provided by Owner.

B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.

C. Request Preparation:
   1. Complete every entry on Payment Request form.
   2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
   3. Submit signed Payment Request to Architect with current Construction Schedule.

D. Provide following submittals before or with submittal of Initial Payment Request:
   1. List of Subcontractors.
   2. Initial progress report.
   3. Contractor's Construction Schedule.
   4. Submittal Schedule.

E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

1.3 SCHEDULE OF VALUES

A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
   1. Contractor's Construction Schedule.
   2. Payment Request form.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Project Management and Coordination on Projects.

1.2 PROJECT COORDINATION

A. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

B. Project designation for this Project is LDS 502-1847-19-0Huntsville Utah Stake.

C. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

1.3 MULTIPLE CONTRACT COORDINATION

A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.

B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

D. Contractor shall be responsible for Final Cleaning for entire Project.

1.4 PROJECT MEETINGS AND CONFERENCES

A. Preconstruction Conference:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect at Project site or other convenient location.
   2. Be prepared to discuss items of significance that could affect progress, including such topics as:
      a. Construction schedule.
      b. Critical Work sequencing.
      c. Current problems.
      d. Designation of responsible personnel.
      e. Distribution of Contract Documents.
      f. Equipment deliveries and priorities.
      g. General schedule of inspections by Architect and its consultants.
      h. General inspection of tests.
      i. Office, work, and storage areas.
      j. Preparation of record documents and O & M manuals.
      k. Procedures for processing interpretations and Modifications.
      l. Procedures for processing Payment Requests.
      m. Project cleanup.

n. Security.
o. Status of permits.
p. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.
q. Use of the premises.
r. Work restrictions.
s. Working hours.

3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three (3) working days.

B. Progress Meetings:
1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a month.
2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
3. Be prepared to discuss items of significance that could affect progress, including following:
a. Progress since last meeting.
b. Whether Contractor is on schedule.
c. Activities required to complete Project within Contract Time.
d. Labor and materials provided under separate contracts.
e. Off-site fabrication problems.
f. Access.
g. Site use.
h. Temporary facilities and services.
i. Hours of work.
j. Hazards and risks.
k. Project cleanup.
l. Quality and Work standards.
m. Status of pending modifications.
n. Documentation of information for Payment Requests.
o. Maintenance of Project records.
4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three (3) working days.

C. Pre-Installation Conferences:
1. Attend pre-installation conferences specified in Contract Document.
a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
b. Request input from attendees in preparing agenda.
2. Be prepared to discuss following items:
a. Requirements of Contract Documents.
b. Completed work necessary for installation of items or systems.
c. Conditions not in compliance with installation requirements.
d. Installation and inspection schedule.
e. Coordination between trades.
f. Space and access limitations.
g. Testing.
3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three (3) working days.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 SCHEDULING OF WORK

A. Bar Chart Schedule:
   1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
   2. Provide copies of schedule for Architect and Owner and post copy in field office.
   3. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.
   4. Project Management Software Programs:
      a. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner's Project Manager.

B. Daily Construction Reports:
   1. Prepare daily reports of operations at Project including at least following information:
      a. List of Subcontractors at site.
      b. Approximate count of personnel at site by trade.
      c. High and low temperatures, general weather conditions.
      d. Major items of equipment on site.
      e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
      f. Accidents and unusual events.
      g. Site or structure damage by water, frost, wind, or other causes.
      h. Meetings, conferences, and significant decisions.
      i. Visitors to the job including meeting attendees.
      j. Stoppages, delays, shortages, losses.
      k. Any tests made and their result if known.
      l. Meter readings and similar recordings.
      m. Emergency procedures.
      n. Orders and requests of governing authorities.
      o. Modifications received, carried out.
      p. Services connected, disconnected.
      q. Equipment or system tests and start-ups.
      r. Brief summary of work accomplished that day.
      s. Signature of person preparing report.
   2. Submit daily reports to Architect at least weekly.
   3. Maintain copies of daily reports at field office.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Submittal Procedures.

B. Related Requirements:
   1. Section 01 7800: 'Closeout Submittals' for administrative and procedural requirements for closeout submittals.

1.2 SUBMITTAL SCHEDULE

A. Furnish submittal schedule within 20 days after receipt of Notice to Proceed, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational submittals.
   1. Coordinate submittal schedule with Contractor's construction schedule.
   2. Enclose the following information for each item:
      a. Scheduled date for first submittal.
      b. Related Section number.
      c. Submittal category.
      d. Name of Subcontractor.
      e. Description of part of the Work covered.
      f. Scheduled date for resubmittal.
      g. Scheduled date for Architect's final release or approval.

B. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.

C. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

1.3 SUBMITTAL PROCEDURES

A. Coordination:
   1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
      a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
      b. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
   2. Processing Time:
      a. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.
         1) Allow 21 days for initial review. Allow additional time if processing must be delayed allowing coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.
         2) If an intermediate submittal is necessary, process same as initial submittal.

3) Allow 10 days for reprocessing each submittal.
4) No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.

3. Identification:
   a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
      1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
      2) Include following information on label for processing and recording action taken:
         a) Project name.
         b) Date.
         c) Name and address of Architect.
         d) Name and address of Contractor.
         e) Name and address of Subcontractor.
         f) Name and address of supplier.
         g) Name of manufacturer.
         h) Number and title of appropriate Specification Section.
         i) Drawing number and detail references, as appropriate.
4. Transmittal:
   a. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. Include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
   b. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Submit Product Data, as required by individual Sections of Specifications.
2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
4. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
5. Submit electronic files PDF: Architect will return a PDF copy marked with action taken and with corrections or modifications required.

B. Shop Drawings:
1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (915 by 1 200 mm). Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
   a. Dimensions.
   b. Identification of products and materials included.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

C. Samples:
1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
   a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
      1) Generic description of Sample.
      2) Sample source.
      3) Product name or name of manufacturer.
      4) Compliance with recognized standards.
      5) Availability and delivery time.
2. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
   a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
   b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
   c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
3. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
4. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
5. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
   a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
   b. Sample sets may be used to obtain final acceptance of construction associated with each set.

1.5 INFORMATIONAL SUBMITTALS

A. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required. [or] Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.
1. **Certificates:** Describe certificates intended to document affirmations by Contractor or others that the work is in accordance with the Contract Documents, but do not repeat provisions of Parts 2 or 3.
2. **Delegated Design Submittals / Design Data:** Describe submittals intended to demonstrate design work prepared by Contractor’s licensed professionals.
3. **Test And Evaluation Reports**: Describe submittal of test reports or evaluation service reports intended to document required tests.
4. **Manufacturer Instructions**: Describe submittals intended to document manufacturer instructions.
5. **Source Quality Control Submittals**: Describe submittal of source quality control documentation.
6. **Field Quality Control Submittals**: Describe submittal of field quality control documentation.
7. **Manufacturer Reports**: Describe submittal of Manufacturer reports as documentation of manufacturer activities.

8. **Special Procedure Submittals**: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
9. **Qualification Statements**: Describe submittals intended to document qualifications of entities employed by Contractor.

1.6 CLOSEOUT SUBMITTALS

A. This title groups submittals that occur during project closeout. Coordinate with section 01 7800 Closeout Submittals.
   1. **As Built Record Drawings as defined in the Agreement.**
   2. **Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.**
   3. **Maintenance Contracts**: Describe submittal of the maintenance contract specific to the Section.
   4. **Operations & Maintenance Data**: Describe submittal of operation and maintenance data necessary for products of the Section.
   5. **Warranty Documentation**: Describe submittal of final executed warranty document specific to the Section.
   6. **Record Documentation**: Describe submittal of record documentation specific to the Section.
   7. Software: Describe submittal system software and programming software specific to the Section.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 Closeout Submittals:
   1. **Spare Parts**: Describe spare parts necessary for Owner's use in facility operation and maintenance. 'Parts' are generally understood to be items such as filters, motor drive belts, lamps, and other similar manufactured items that require only simple replacement.
   2. **Extra Stock Materials**: Describe extra stock materials to be provided for Owner's use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
   3. **Tools**:
      a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Reference standards, definitions, specification format, and industry standards.

1.2 REFERENCES

A. Definitions:
   1. Approved: The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
   2. Directed: The term "directed" is a command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," and "permitted" have the same meaning as "directed."
   3. Experienced: The term "experienced," when used with an entity, means having successfully completed a minimum often previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.
   4. Furnish: The term "furnish" means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
   5. General: Basic Contract definitions are included in the Conditions of the Contract.
   6. Indicated: The term "indicated" refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
   7. Install: The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
   8. Installer: An "Installer" is the Contractor or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   9. Project Site: The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and mayor may not be identical with the description of the land on which the Project is to be built.
   10. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.
   11. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
   12. Submitted: The terms "submitted," "reported," "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
   13. Testing Agencies: A "testing agency" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, or to report on and, if required, to interpret results of those inspections or tests.
   14. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

B. References Standards:

1. Specification Format: Specifications will follow MasterFormat™ 2004 for organizing numbers and titles. (The Construction Specifications Institute, Project Resource Manual/CSI Manual of Practice, 5th *Edition*. New York, McGraw-Hill, 2005).
   a. Specification Identifications:
      1) The Specifications use section numbers and titles to help cross referencing in the Contract Documents.
      2) Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
   b. Specification Language:
      1) Specifications should be prepared, with concern and respect for their legal status. Specifications should be Clear, Concise, Correct and Complete.
      2) Streamlining: Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference
   c. Sentence Structure:
      1) Specifications to be written in the “Imperative Mood”.
         a) The verb that clearly defines the action becomes the first word in the sentence.
         b) The imperative sentence is concise and readily understandable.
      2) Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference.
   d. Abbreviated Language:
      1) Abbreviations should be used only on drawings and schedules where space is limited.
      2) Abbreviations with multiple meanings should be avoided, unless used in different disciplines where their meaning is clear from the context in which they are used.
      3) Abbreviations should be limited to five or fewer letters
         a) The verb that clearly defines the action becomes the first word in the sentence.
   e. Symbols:
      1) Caution should apply to symbols substituted for words or terms.
   f. Numbers:
      1) The use of Arabic numerals rather that words for numbers is recommended.

C. Industry Standards:
   1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
   2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
   3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
   4. Trade Association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5664	www.aamanet.org
AAMA	American Architectural Manufacturers Association	Schamumburg	IL	(847) 303-5774	www.aamanet.org
AIA	American Institution of Architects	Washington	DC	(202) 626-7300	www.aia.org
AISC	American Institute of Steel	Chicago	IL	(312) 670-2400	www.aisc.org

	Construction				
AISI	American Iron & Steel Institute	Washington	DC	(202) 452-7100	www.steel.org
AITC	American Institution of Timber Construction	Englewood	CO	(303) 792-9559	www.aitc-glulam.org
ANSI	American National Standards Institute	New York	NY	(212) 642-4900	www.ansi.org
APA	APA-Engineered Wood Association	Tacoma	WA	(253) 565-6600	www.apawood.org
ASTM	ASTM International	West Conshohocken	PA	(610) 832-9500	www.astm.org
AWI	Architectural Woodwork Institute	Potomac Falls	VA	(571) 323-3636	www.awinet.org
AWPA	American Wood Protection Association	Birmingham	AL	(205) 733-4077	www.awpa.com
BHMA	Builders Hardware Manufacturers Association	New York	NY	(212) 297-2122	www.buildershardware.com
HPVA	Hardwood Plywood & Veneer Association	Reston	VA	(703) 435-2900	www.hpva.org
ICC	International Code Council	Washington	DC	(888) 422-7233	www.iccsafe.org
ICC-ES	ICC Evaluation Service	Whittier	CA	(562) 699-0543	www.icc-es.org
ICBO	International Conference of Building Officials				(See ICC)
ISO	International Organization for Standardization	Geneva, Switzerland			www.iso.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	www.spib.org
UL	Underwriters Laboratories	Camas	WA	(877) 854-3577	www.ul.com
WWPA	Western Wood Products Association	Portland	OR	(503) 224-3930	www.wwpa.org

D. Federal Government Agencies:

1. Names and titles of federal government standard or specification producing agencies are often abbreviated. Following acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

CS	Commercial Standard (U S Department of Commerce)	Washington	DC	(202) 512-0000	www.doc.gov
EPA	Environmental Protection Agency	Washington	DC	(202) 272-0167	www.epa.gov
FCC	Federal Communications Commission	Washington	DC	(888) 225-5322	www.fcc.gov
FS	Federal Specifications Unit (Available from GSA)	Washington	DC	(202) 619-8925	www.gsa.gov
MIL	Military Standardization Documents (U S Department of Defense)	Philadelphia	PA	(215) 697-2179	www.dod.gov
NIST	National Institute of Standards and Technology, technology Administration (US Department of Commerce)	Gaithersburg	MD	(301) 975-4500	www.ts.nist.gov
OSHA	Occupational Safety & Health Administration (U S Department of Labor)	Washington	DC	202) 219-8148	www.osha.gov
PS	Product Standard of NBS (U S Department of Commerce)	Washington	DC	(202) 512-1800	www.doc.gov

E. Governing Regulations / Authorities:

1. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
2. Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4301

QUALITY ASSURANCE - QUALIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
   1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

1.2 REFERENCES

A. Definitions:
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. 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.
   3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
   4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

B. Reference Standards:
   1. ASTM International:
      a. ASTM E329-14a, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

1.3 QUALIFICATIONS

A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
   1. Fabricator / Supplier / Installer Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
      a. VMR (Value Managed Relationship):
         1) Where heading '*VMR (Value Managed Relationship) / Manufacturers / Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project.
         2) No other *Suppliers / Installers* will be acceptable.
         3) Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
         4) Following areas of the Work have restrictions on sub-bids by Contractor:
            a) Asphalt Shingles, Section 07 3113: VMR, no other Manufacturer / Installers accepted.

b) Polyvinyl-Chloride Roofing: PVC, Section 07 5419: VMR, no other Manufacturer / Installers accepted.
c) Wood Framing, Division 06 'Wood', VMR Supplier, no other Supplier accepted for USA Projects Only except approved Supplier:
(1) Wood-Panel Product Sheathing, Section 06 1636.

b. Approved:
1) Where heading '*Approved Suppliers / Distributors / Installers / Applicators / Fabricators*' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
2) No substitutions will be allowed.

2. Factory-Authorized Service Representative Qualifications:
a. 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.
3. 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.
4. 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.
5. Manufacturer's Field Services Qualifications:
a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. 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 kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:
a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1) Testing Laboratory:
a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
b) Cement and Concrete Reference Laboratory (CCRL).
c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4523

TESTING AND INSPECTING SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.

B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.

C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
   1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.

D. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

1.3 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   2. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions:
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. Approved: To authorize, endorse, validate, confirm, or agree to.
   3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
   4. Inspection/Special Inspection:
      a. Inspection: Not required by code provisions but may be required by Contract Documents.
      b. Special Inspection: Inspection required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance

with approved construction documents and reference standards (required by code provisions and by Contract Documents).
   c. Special Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Special Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
8. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
9. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
10. Special Inspection: See Inspection.
11. Special Inspector: Certified individual or firm that implements special inspection program for project.
12. Special Test: See Test.
13. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship:
   a. Test: Not required by code provisions but may be required by Contract Documents.
   b. Special Test: Required by code provisions and by Contract Documents.
14. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
15. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
16. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
1. ASTM International:
   a. ASTM A898/A898M-17, ‘Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes’.
   b. ASTM C42/C42M-16, ‘Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
   c. ASTM C138/C138M-17a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
   d. ASTM C597-16, ‘Standard Test Method for Pulse Velocity Through Concrete'.
   e. ASTM C803/C803M-17, ‘Standard Test Method for Penetration Resistance of Hardened Concrete'.
   f. ASTM C805/C805M-13a, ‘Standard Test Method for Rebound Number of Hardened Concrete'.
   g. ASTM C1019-16, ‘Standard Test Method for Sampling and Testing Grout’.
   h. ASTM C1021-08(2014), ‘Standard Practice for Laboratories Engaged in Testing of Building Sealants’.
   i. ASTM C1077-16a, ‘Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation’.
   j. ASTM C1093-15a, ‘Standard Practice for Accreditation of Testing Agencies for Masonry.
   k. ASTM D3666-16, ‘Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials’.

l. ASTM D3740-12a, ‘Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction’.
m. ASTM E114-15, ‘Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method’.
n. ASTM E164-13, ‘Standard Practice for Contact Ultrasonic Testing of Weldments’.
o. ASTM E329-14a: ‘Standard Specification for Agencies Engaged in Construction Inspection and/or Testing’.
p. ASTM E488-15, ‘Standard Test Methods for Strength of Anchors in Concrete Elements'.
q. ASTM E543-15, ‘Standard Specification for Agencies Performing Nondestructive Testing’.
r. ASTM E587-15, ‘Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method’.
s. ASTM E709-15, ‘Standard Guide for Magnetic Particle Testing’.
t. ASTM E1212-17, ‘Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
u. ASTM F710-11, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
v. ASTM F2170-16b, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.

2. Code of Federal Regulations:
   a. 29 CFR 1910, Subpart A, Section 1910.7, ‘Definition and Requirements for a Nationally Recognized Testing Laboratory’.
3. International Code Council (IBC 2015 or latest approved edition):
   a. IBC Chapter 17, ‘Special Inspections And Tests’.
      1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
      2) Section 1705, ‘Required Special Inspection And Tests’.
         a) Section 1705.2, 'Steel Construction'.

1.4 SUBMITTALS

A. Informational Submittals:
   1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.
   2. Certificates:
      a. Testing Agency will submit certified written report of each inspection, test, or similar service.
   3. Tests and Evaluation Reports:
      a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
         1) 1 copy to Owner’s Representative.
         2) 1 copy to Architect.
         3) 1 copy to General Contractor.
         4) 1 copy to Authorities Having Jurisdiction (if required).
      b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner’s Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
      c. Submittal Format:
         1) Schedule of Tests and Inspections: Prepare in tabular form and include following:
            a) Specification Section number and title.
            b) Description of test and inspection.
            c) Identification of applicable standards.
            d) Identification of test and inspection methods.
            e) Number of tests and inspections required.
            f) Time schedule or time span for tests and inspections.
            g) Entity responsible for performing tests and inspections.
            h) Requirements for obtaining samples.
         2) Certified written reports of each inspection, test, or similar service will include, but not be limited:
            a) Date of issue.

b) Project title and number.
c) Name, address, and telephone number of Testing Agency.
d) Dates and locations of samples and tests or inspections.
e) Names of individuals making tests and inspections.
f) Description of the Work and test and inspection method.
g) Identification of product and Specification Section.
h) Complete test or inspection data.
i) Test and inspection results and an interpretation of test results.
j) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
k) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
l) Name and signature of laboratory inspector.
m) Recommendations on retesting and re-inspecting.

4. Source Quality Control Submittals:
   a. Testing Agency will submit following prior to commencing the Work:
      1) Qualifications of Testing Agency management and personnel designated to project.
      2) Testing Agency 'Written Practice for Quality Assurance'.
      3) Qualification records for Inspector and non-destructive testing technicians designated for project.
      4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
      5) Testing Agency Quality Control Plan for monitoring and control of testing operations.
      6) Bolting Inspection Procedures (Structural Steel testing).
      7) Shear Connector Stud Inspection Procedures (Structural Steel testing).
      8) Seismic Connections Inspection Procedures (Structural Steel testing).

1.5 QUALITY ASSURANCE

A. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.

B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.

C. Certification:
   1. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
   2. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.

D. Written Practice for Quality Assurance:
   1. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
   2. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   3. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

1.6 QUALITY CONTROL

A. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing and inspections, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.

B. Contractor will assign one (1) employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.

C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
   1. Testing and Inspection Reports will be distributed as follows:
      a. 1 copy to Owner's Representative.
      b. 1 copy to Architect.
      c. 1 copy to Authorities Having Jurisdiction (if required).

D. Contractor's Responsibility:
   1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
   2. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   3. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
      a. Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
      b. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      d. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   4. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.
   5. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   6. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.
   7. For Mechanical Equipment, inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system:
      a. Contractor will perform thorough checkout of operations with manufacturer's representatives prior to requesting formal inspection by Owner.
      b. Contractor must notify Owner's Representative, in advance, as to when manufacturer's representative is scheduled to arrive at Site.
   8. Comply:
      a. Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
      b. Comply with Contract Documents in making such repairs.
   9. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   10. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:
      a. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid Work delays.

b. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
c. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
d. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
e. Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.

11. Protection:
    a. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
12. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
    a. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
    b. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 50 prior to any time required for such services.
    c. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
    d. Schedule sequence of activities to accommodate required services with minimum of delay.
    e. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections
13. Test and Inspection Log:
    a. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include 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 inspector conducting test or inspection.
    b. Maintain log at Project site:
        1) Post changes and modifications as they occur.
        2) Provide access to test and inspection log for Architect's reference during normal working hours.

1.7 TESTING AND INSPECTIONS - GENERAL

A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.

B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.

C. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 49.

D. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
    1. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
    2. Contractor must cooperate with persons and firms engaged in these activities.

E. Taking Specimens:
    1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.

F. Scheduling Testing Agency:

1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.

G. For 'building-wide' and/or life safety systems, such as emergency lighting, emergency power uninterruptible power supply systems, fire alarm, fire sprinkler systems, smoke evacuation systems, toxic gas monitoring, capturer exhaust systems, etc. formal start-up inspection will be completed prior to requesting Substantial Completion Inspection for any area of Project:
   1. Manufacturer's representatives and installing contractor will demonstrate both operation and compliance to Owner's agents and consultants. If coordinated and scheduled appropriately by Contractor, these equipment and/or systems inspections may also serve to provide required Owner training, if approved in advance by Owner.
   2. Contractor responsible for requesting that Architect arrange for inspection of materials, equipment, and work prior to assembly or enclosure that would make materials, equipment, or work inaccessible for inspection and at other times as may be required.

1.8 TESTING AGENCY SERVICES AND RESPONSIBILITIES

A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
   1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.

B. Testing and Inspection Services:
   1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
   2. Testing Agency will not give direction or instruction to Contractor.
   3. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
   4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner's Representative and / or Architect.

C. Excavation Support and Protection:
   1. Anchor tie-back System:
      a. Observe and record proof tests.
   2. Soil Nail Systems:
      a. Observe and record proof tests.
      b. Observe drilling for changes in soil type, hole diameter, length, and cleanliness.
      c. Periodically observe placement of drainage materials, reinforcing, and shotcrete.
      d. Review compressive strength test results of grout and shotcrete.

D. Testing Agency Duties:
   1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   4. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
   5. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
   6. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

7. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and will verify compliance with all reference standard requirements.

E. Testing and Inspection Reports:
   1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
   2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      a. Description of method of test.
      b. Identification of sample and portion of the Work tested.
         1) Description of location in the Work of sample.
         2) Time and date when sample was obtained.
         3) Weather and climatic conditions at time when sample was obtained.
      c. Evaluation of results of tests including recommendations for action.
   3. Inspection Reports:
      a. Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections.
      b. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
   4. Reporting Testing and Inspection (Conforming Work):
      a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
         1) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
         2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
      b. Prepare non-compliance log to track non-compliant testing or inspections.
   6. Final Report:
      a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

1.9 ARCHITECT'S RESPONSIBILITIES

A. Architect Duties:
   1. Notify Owner's Representative before each test and/or inspection.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Field Tests and Inspections requirements are described in 'Field Quality Control' of individual Sections in Division 01 through Division 49.

END OF SECTION

SECTION 01 5200

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Construction Facilities.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Prepare schedule indicating dates for implementation and termination of each temporary facility.

B. Keep temporary facilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.

C. Maintain facilities in good operating condition until removal.

D. Remove each temporary facility when need has ended, or when replaced by authorized use of permanent facility, or by Substantial Completion. Complete 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 make up temporary facilities are property of Contractor.
   2. By Substantial Completion, clean and renovate permanent facilities used during construction period.

1.3 SANITARY FACILITIES

A. Provide temporary sanitary toilet. Service and maintain temporary toilet in a clean, sanitary condition.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 6100

COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Common Product Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
   1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
   2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.

D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.

E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.

F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.

G. Where specified product requirements include phrase ` . . . *as selected from manufacturer's standard colors, patterns, textures* . . . ' or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

H. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

I. Informational Submittals:
   1. Sustainable Design Submittals:
      a. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
      b. Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6200

PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Product Options.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Product Selection:
   1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.
      a. Regional materials.

B. Non-Conforming Work:
   1. Non-conforming work as covered in Article 12.3 of General Conditions applies, but is not limited, to use of non-specified products or manufacturers.

C. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
   1. Substitutions And Equal Products:
      a. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:
         1) Category One:
            a) Owner has established ‘Relationships’ that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Owner Furnished and Owner Installed Manufacturers or Products.
            c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
         2) Category Two:
            a) Owner has established ‘Relationships' that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Owner Furnished and Contractor Installed Manufacturers, Suppliers, Distributors or Products.
            c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
         3) Category Three:
            a) Owner has established ‘Relationships' that contain provisions extending beyond requirements of this Project. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Contractor Furnished and Contractor Installed Manufacturers, Suppliers, Distributors, Fabricators or Products.
         4) Category Four:

a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as a convenience to Contractor as a listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.

c. Acceptable Products / Manufacturers / Suppliers / Installers:
1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect by Addendum.
2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect in writing before installing or applying unlisted or private-labeled products.
3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.

d. Quality / Performance Standard Products / Manufacturers:
1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
3) Products / manufacturers used shall conform to Contract Document requirements.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6600

PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Product Delivery, Storage, and Handling Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1.3 DELIVERY AND ACCEPTANCE REQUIREMENTS

A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.

B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

C. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

1.4 STORAGE AND HANDLING REQUIREMENTS

A. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.

B. Store heavy materials away from Project structure so supporting construction will not be endangered.

C. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for governing Execution of the Work.

1.2 COMMON INSTALLATION PROVISIONS

A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.

B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.

C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.

D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.

F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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SECTION 01 7400

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.

B. Related Requirements:
   1. Section 01 1200: Coordination of responsibilities for waste management.
   2. Section 01 6400: Waste removal of Owner furnished products.
   3. In addition to standards described in this section, comply with all requirements for cleaning-up as described in various other Sections of these Specifications.

1.2 REFERENCES

A. Definitions:
   1. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waster or debris.
   2. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
   3. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
   4. 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.
   5. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
   6. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
   7. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.

B. Keep premises broom clean during progress of the Work.

C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.

D. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.

E. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

F. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

G. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.

H. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.

I. Construction Waste Management And Disposal:
   1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
      a. Provide adequate waste receptacles and dispose of materials when full.
      b. Properly store volatile waste and remove daily.
      c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
   2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

3.2 FINAL CLEANING

A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.

B. Comply with individual manufacturer's cleaning instructions.

C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
   1. Exterior Cleaning:
      a. Remove marks, stains, and dirt from exterior surfaces.
      b. Remove temporary protection systems.
      c. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
      d. Clean drop inlets, through-curb drains, and other drainage structures.
      e. Remove trash, debris, and foreign material from landscaped areas.

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Closeout Procedures.

1.2 GENERAL

A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.

B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.

C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

1.3 PRELIMINARY CLOSEOUT REVIEW

A. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.

1.4 SUBSTANTIAL COMPLETION INSPECTION

A. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.

B. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.

C. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
   1. Date of Substantial Completion.
   2. Punch List Work not yet completed, including seasonal and long lead items.
   3. Amount to be withheld for completion of Punch List Work.
   4. Time period for completion of Punch List Work.
   5. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.

D. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

1.5 FINAL ACCEPTANCE MEETING

A. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.

B. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
   1. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
   2. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
   3. Final cleaning requirements have been completed.

C. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.

D. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Closeout Submittals.

B. Related Requirements:
   1. Section 01 3300: 'Submittal Procedures' for administrative and procedural requirements for submittal procedures.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Project Record Documents:
   1. Do not use record documents for construction purposes:
      a. Protect from deterioration and loss in secure, fire-resistive location.
      b. Provide access to record documents for Architect's reference during normal working hours.
   2. Maintain clean, undamaged set of Drawings:
      a. Mark set to show actual installation where installation varies from the Work as originally shown.
      b. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
      c. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
      d. Mark new information that is important to Owner, but was not shown on Drawings.
      e. Note related Change Order numbers where applicable.

B. As Built Record Drawings:
   1. As required in agreement with the Owner:
      a. Architect will provide two full-size sets of prints of the As Built Record Drawings to the Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner.
      b. Architect will submit following:
         1) Revit Model O&M lifecycle requirements to be tracked by Facility Manager.

1.3 CLOSEOUT SUBMITTALS

A. Operations And Maintenance Manual:
   1. General:
      a. Include closeout submittal documentation as required by Contract Documentation.
      b. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
      c. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
      d. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.
      e. Submittal Format:

1) Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
2) Include only closeout submittals as defined in individual specification section as required in Contract Documents.

2. Project Manual:
   a. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
      1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
      2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Maintenance Contracts:
   a. Digital format only.
4. Operations and Maintenance Data:
   a. Digital format only:
      1) Cleaning instructions.
      2) Maintenance instructions.
      3) Operations instructions.
      4) Equipment list.
      5) Parts list.
5. Warranty Documentation:
   a. Digital format of final, executed warranties.
6. Record Documentation:
   a. Digital format only.
      1) Certifications.
      2) Color and pattern selections.
      3) Design Data.
      4) Manufacture Reports.
      5) Manufacturer's literature or cut sheets.
      6) Shop Drawings.
      7) Source Quality Control.
      8) Special Procedures.
      9) Testing and Inspection Agency Reports.
      10) Testing and Inspection Reports.

B. Revit Model O&M Requirements:

1. Architect to include all information for each instance that occurs from below list within associated family in Revit model (ie. serial numbers, warranty information, manufacturer, etc):
   a. Revit Model Items:

Item	Inventory Name	Categories
151	Roofing, Asphalt Shingles	Roofing
157-B	Roofing, Single Ply Membrane (PVC)	Roofing

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Submit item(s) required by Section 01 3300 'Submittal Procedures' and as defined in individual specification section if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

1.5 WARRANTIES

A. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.

B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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DIVISION 03: CONCRETE

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SECTION 03 1113

STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Design, construction, and safety of formwork.
   2. Furnish and install required formwork ready for placing of concrete.
   3. Strip and dispose of formwork.

B. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
      a. Tolerances for placing structural concrete.
      b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

A. Reference Standards:
   1. American Concrete Institute:
      a. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 03 3111.
   2. In addition to agenda items specified in Section 01 3100 and 31 3111, review following:
      a. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review requirements and frequency of testing and inspections.

B. Scheduling:
   1. Notify Testing Agency and Architect as directed in Section 03 3111.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Instructions:
      a. Printed application instructions for form release agents.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Forms: Wood, metal, or plastic as arranged by Contractor:
   1. Forming material shall be compatible with specified form release agents and with finish requirements for concrete to be left exposed or to receive a smooth rubbed finish.

2.2 ACCESSORIES

A. Form Release Agents:
   1. Unexposed Surfaces Only: Contractor's option.

B. Expansion / Contraction Joints:
   1. 1/2 inch (13 mm) thick.
   2. Manufactured commercial fiber type:
      a. Meet requirements of ASTM D1751.
      b. Type Two Acceptable Products:
         1) Conflex by Knight-Celotex, Northfield, IL www.aknightcompany.com.
         2) Sealtight by W R Meadows Inc, Hampshire, IL www.wrmeadows.com.
         3) Equal as approved by Architect before installation. See Section 01 6200.
   3. Recycled Vinyl:
      a. Light gray color.
      b. Type Two Acceptable Products:
         1) Proflex by Oscoda Plastics Inc, Oscoda, MI www.oscodaplastics.com.
         2) Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Forms:
   1. Assemble forms so forms are sufficiently tight to prevent leakage.
   2. Properly brace and tie forms.
   3. Make proper form adjustments before, during, and after concreting.
   4. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish.

B. Accessories:
   1. General:
      a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
      b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.
   2. Form Release / Finish Agents:
      a. Film thickness shall be no thicker than as recommended by Manufacturer.
      b. Allow no release / finish agent on reinforcing steel or footings.
   3. Expansion Joints:
      a. Install at joints between floor slab and foundation wall where shown on Drawings.

C. Form Removal (Slab on Grade):
   1. Removal of forms can usually be accomplished in twelve (12) to twenty-four (24) hours.
   2. If temperature is below 50 deg F (10 deg C) or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
   3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still “green”.
   4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

3.2 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Concrete Formwork:

a. Inspections are not required and will be performed at discretion of Architect.

END OF SECTION

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SECTION 03 1511

CONCRETE ANCHORS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Cast-in place and post-installed concrete anchors including:
      a. Adhesive anchors for concrete.
      b. Expansion anchors for concrete.
      c. Screw anchors for concrete.
      d. Concrete anchors and inserts not specified elsewhere.
   2. Installer responsible when inspection results of concrete anchors require corrective actions.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
   2. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   3. Section 03 3111: ‘Cast-In-Place Structural Concrete’ for installation and inspection of cast-in-place anchors.

1.2 REFERENCES

A. Reference Standards:
   1. American Concrete Institute:
      a. ACI 355.4-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary'.
      b. ACI 548.12-12, 'Specification for Bonding Hardened Concrete and Steel to Hardened Concrete with an Epoxy Adhesive'.
   2. American National Standards Institute / American Welding Society (Following are specifically referenced for Structural Steel testing):
      a. ANSI/AWS D1.1/D1.1M:2015, ‘Structural Welding Code - Steel’.
   3. ASTM International:
      a. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength’.
      b. ASTM A563-15, 'Standard Specification for Carbon and Alloy Steel Nuts’.
      c. ASTM A706/A706M-16, ‘Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement’.
      d. ASTM F1554-18, ‘Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength’.
      e. ASTM F3125/F3125-15a, ‘Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions'.
   4. International Code Council (IBC) (2018 or most recent edition adopted by AHJ):
      a. IBC Chapter 17, ‘Structural Tests and Special Inspections’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Inspection shall be performed according IBC requirements.

2. Notify Testing Agency and Architect one week before installing anchors so inspection may be scheduled.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's product literature for each item.

B. Informational Submittals:
   1. Certificates:
      a. Adhesive Anchors:
         1) Installer to provide current ACI/CRSI certification to Architect prior to installation of anchors.
   2. Test And Evaluation Reports:
      a. Provide ESR for products used indicating conformance with current applicable ESR Acceptance Criteria.
   3. Manufacturer’s Instructions:
      a. Manufacturer's published installation recommendations for each item.
   4. Qualification Statements:
      a. All concrete anchors except Adhesive Anchors:
         1) Installer to provide record of installer installation training showing dates and those trained for all installed products when required when by Architect.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency inspection reports of all inspected anchors.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Having sufficient capacity to produce and deliver required materials without causing delay in work.
   2. Installer:
      a. Acceptable to Manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.
      b. Adhesive Anchors:
         1) Adhesive Anchors installed in horizontal to vertical overhead orientation to support sustained tension loads shall be installed by Certified Adhesive Anchor Installer (AAI) as certified through ACI/CRSI:
            a) Refer to most current version of ACI 318 for certification requirements.
            b) Proof of current certification shall be submitted to the Architect for approval prior to commencement of installation.
      c. All other Concrete Anchors:
         1) Arrange for manufacturer’s field representative to provide installation training for all products to be used, prior to commencement of work:
            a) Provide installation training when required by Architect.

B. Field Inspection:
   1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will provide Inspection for post-installed concrete anchors:
      a. Owner will employ testing agency to perform inspection for post-installed concrete anchors as specified in Field Quality Control in Part 3 of this specification:

1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
1. Store materials protected from exposure to harmful weather conditions and as directed by Manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Anchors:
1. General:
a. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
b. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch (6.4 mm) by 3 inch (76 mm) x 3 inch (76 mm) minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
c. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
d. Conform to requirements of ASTM F3125/F3125 for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
2. Threaded rod for adhesive anchors and cast-in anchors:
a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
3. Cast-In-Place Anchor Bolts:
a. J-Bolts:
1) Non-headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
2) Anchor hook to project 2 inches (50 mm) minimum including bolt diameter.
b. Headed Bolts:
1) Headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
4. Reinforcing Bars:
a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60.
5. Adhesive Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC308 for concrete.
b. Rod diameter and embedment length as indicated on Contract Drawings.
c. Type Two Acceptable Products:
1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6200.
6. Expansion Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC193 for concrete.

b. Type Two Acceptable Products:
1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6200.

7. Screw Anchors:
a. Provide anchors with length identification markings conforming to ICC Acceptance Criteria AC 193 for concrete.
b. Type Two Acceptable Products:
1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Titen HD by Simpson Strong Tie Co, Pleasonton, CA www.simpsonanchors.com.
4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Embedded Items:
a. Identify position of reinforcing steel and other embedded items before drilling holes for anchors:
1) Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
2) Take precautions as necessary to avoid damaging pre-stressing tendons, electrical and telecommunications conduit, and gas lines.
b. Notify Engineer if reinforcing steel or other embedded items are encountered during drilling.
2. Base Material Strength:
a. Unless otherwise specified, do not drill holes in concrete until:
1) Concrete has minimum age of 21 days at time of anchor installation.
2) Concrete has achieved full design strength for load achievement.

3.2 PREPARATION

A. Surface Preparation:
1. Clean surfaces prior to installation.
2. Prepare surface in accordance with Manufacturer’s written recommendations.

3.3 INSTALLATION

A. Post-Installed Anchors:
1. General:
a. Drill holes with rotary impact hammer drills using carbide-tipped bits.
b. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
c. Perform anchor installation in accordance with Manufacturer’s published instructions.
2. Adhesive Anchors:
a. Clean holes in accordance with Manufacturer’s published instructions before installation of adhesive:
1) Follow Manufacturer’s recommendations to ensure proper mixing of adhesive components.
b. Adhesive:
1) Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.

2) Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
3) Remove excess adhesive from surface and threads of anchor as necessary.

c. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.

d. Temperature:
1) Observe Manufacturer's recommendations with respect to installation temperatures for adhesive anchors.
2) Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.

3. Expansion Anchors:
a. Protect threads from damage during anchor installation and prior to use.
b. Set anchors to Manufacturer's recommended torque, using a torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.

4. Screw Anchors:
a. Protect threads from damage during anchor installation and prior to use.
b. Set anchor flush, collared.
c. Do not exceed Manufacturer's maximum allowed torque when seating anchor.

3.4 FIELD QUALITY CONTROL

A. Field And Inspections:
1. Civil and structural field inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
a. Quality Control is sole responsibility of Contractor.
1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

2. Expansion Anchors / Adhesive Anchors / Screw Anchors:
a. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
b. Inspections:
1) Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
a) The correct rod/anchor is used; size and type.
b) The correct hole size is used and prepared per Manufacturer's instructions.
c) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
d) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
e) Torque applied to anchors does not exceed Manufacturer's allowable limits.
f) Torque applied to anchors is per Manufacturer's instructions.

B. Non-Conforming Work:
1. Contractor is to immediately notify Architect of incorrectly placed, misplaced or malfunctioning anchors and request instructions for corrective actions.

3.5 CLEANING

A. Waste Management:
1. Disposal of rubbish, debris, and packaging materials.

3.6 PROTECTION

A. General:
   1. Protect installed products from damage during construction.

END OF SECTION

SECTION 03 2100

REINFORCEMENT BARS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install concrete reinforcement bars as described in Contract Documents.

B. Related Requirements:
   1. Section 01 0000: ‘General Requirements’:
      a. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
      b. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   2. Section 03 1113: Structural Cast-In-Place Concrete Forming'.
   3. Section 03 2116: 'Epoxy-Coated Reinforcement Bars'.
   4. Section 03 3111: ‘Cast-In-Place Structural Concrete’ for:
      a. Reinforcement installed in concrete.
      b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute:
      a. ACI 'Detailing Manual' (2004 Edition).
   2. Concrete Reinforcing Steel Institute (CRSI):
      a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).

B. Reference Standards:
   1. American Concrete Institute:
      a. ACI 117-10: ‘Specifications for Tolerances for Concrete Construction and Materials and Commentary’ (Reapproved 2015).
      b. ACI 318-14, ‘Building Code Requirements for Structural Concrete and Commentary'.
   2. ASTM International (Following are specifically referenced for reinforcement bars testing):
      a. ASTM A615/A615M-18, ‘Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 03 3111.
   2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
      a. Installation scheduling and reinforcing placement.
      b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review requirements and frequency of testing and inspections.

B. Scheduling:
   1. Notify Testing Agency and Architect as directed in Section 03 3053 and Section 03 3111.

1.4 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Reinforcing placement drawings.

B. Informational Submittals:
   1. Certificates:
      a. Mill certificates for mill tests for reinforcing in accordance with ASTM A615/A615M.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Inspection Reports of reinforcement bars.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
      a. American Concrete Institute:
         1) ACI 318, ‘Building Code Requirements for Structural Concrete and Commentary'.
      b. Concrete Reinforcing Steel Institute:
         1) CRSI, 'Manual of Standard Practice'.

B. Qualifications:
   1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
      a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.
      b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.

C. Testing And Inspection:
   1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will provide Testing and Inspection for inspection of reinforcement bars:
      a. Owner will employ testing agencies to perform testing and inspection for inspection of reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
         1) Owner’s employment of an independent Testing Agency does not relieve Contractor of Contractor’s obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
         2) See Section 01 1200: ‘Multiple Contract Summary’.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
   2. Reinforcement bars shall be free of heavy rust scales and flakes, or other coating at time of delivery and placing.

B. Storage And Handling Requirements:
   1. Properly protect rebar on site after delivery.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Reinforcement Bars:
   1. Bars shall have grade identification marks and conform to ASTM A615/A615M:
      a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
   2. Bars shall be deformed type.
   3. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

2.2 ACCESSORIES

A. Bar Supports:
   1. Concrete masonry units or bricks are not acceptable.
   2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CSRI, Class 2).
   3. Type Two Acceptable Products:
      a. Concrete 'dobies' or blocks wired to reinforcing.
      b. Manufactured chairs with 4 sq inch (25.8 sq cm) bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
      c. Equals as approved by Architect before installation. See Section 01 6200.

2.3 FABRICATION

A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.
   2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
   3. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
   4. Reinforcement shall not be bent after partially embedded in hardened concrete.

B. Placing Reinforcement:
   1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
   2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
      a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
      b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
      c. Install bar supports at bar intersections.
   3. Bend bars cold.

4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

C. Splices:
1. Non-Concrete Structural System:
   a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
2. Concrete Structural System:
   a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
   b. Lap bars as follows:
      1) Compression Splices: 45 bar diameters minimum.
      2) Tension Splices: In accordance with ACI 318 Class B requirements.
      3) No splice shall be less than 20 inches (508 mm).
      4) For epoxy coated rebar, increase lap-splice lengths by 1.5 times those listed above.
   c. In columns, splices in vertical bars are permitted only at floor levels or points of lateral support and shall consist of 45 bar diameter laps.
   d. Run reinforcement bars continuous through cold joints.

D. Tolerances:
1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
   a. Concrete Exposed to Earth or Weather:
      1) No. 6 and Larger Bars: 2 inches (50 mm).
      2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches (38 mm).
   b. Concrete not exposed to weather or in contact with ground:
      1) Slabs, walls, and joists:
         a) No. 14 and No. 18 bars: 1-1/2 inches (38 mm).
         b) No. 11 bars and smaller: 3/4 inches (19 mm).

3.2 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
   a. Quality Control is sole responsibility of Contractor.
      1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
         a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars:
   a. Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

END OF SECTION

SECTION 03 3111

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install concrete work as described in Contract Documents including:
      a. Quality of concrete used on Project but furnished under other Sections.
      b. Concrete mix information and use of admixtures.
      c. Field Quality Control Testing and Inspection requirements for concrete.
      d. Pre-installation conference held jointly with other concrete related sections.
      e. Sealants and curing compounds used with concrete.
      f. Compact aggregate base for miscellaneous cast-in-place concrete.
      g. Miscellaneous cast-in-place concrete and equipment pads.

B. Products Installed But Not Furnished Under This Section:
   1. Concrete accessories.
   2. Inserts, bolts, boxes, templates, and fastening devices for other work, including those for bases only for Mechanical and Electrical.

C. Related Requirements:
   1. Section 01 0000: 'General Requirements':
      a. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
      b. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   2. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
   3. Section 03 1511: 'Concrete Anchors and Inserts'.
   4. Section 03 2100: 'Reinforcement Bars'.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 117.1R-14: 'Guide for Tolerance Compatibility in Concrete Construction'.
      b. Certifications:
         1) ACI CP-1(16), *'Technical Workbook for ACI Certification of Concrete Field Testing Technician-Grade 1*'.
         2) ACI CP-10(10), *'Craftsman Workbook for ACI Certification of Concrete Flatwork Technician/Finisher'*.
         3) ACI CP-19(16), *'Technical Workbook for ACI Certification of Concrete Strength Testing Technician'*.

B. Definitions:
   1. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F (4.4 deg C) in twenty-four (24) hour period.
   2. Floor Flatness (F_F): Rate of change in elevation of floor over 12 inches (305 mm) section.
   3. Floor Levelness (F_L): Measures difference in elevation between two points which are 10 feet (3.05 m) apart.

4. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F (38 deg C) or ambient air temperature above 90 deg F (32 deg C) with wind velocity 8 mph (12.9 kph) or greater.

C. Reference Standards:
   1. American Association of State and Highway Transportation Officials:
      a. AASHTO M 153-06 (2016), 'Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction'.
   2. American Concrete Institute
      a. ACI 117-10 (R2015): 'Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
      b. ACI 305.1-14, 'Specification for Hot Weather Concreting'.
      c. ACI 306.1-90 (R2002), 'Standard Specification for Cold Weather Concreting'.
      d. ACI 318-14, 'Building Code Requirements for Structural Concrete' (ACI 318) and 'Commentary on Building Code Requirements for Structural Concrete' (ACI 318R).
   3. ASTM International:
      a. ASTM C31/C31M-19, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
      b. ASTM C33/C33M-18, 'Standard Specification for Concrete Aggregates'.
      c. ASTM C39/C39M-18, 'Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.
      d. ASTM C94/C94M-17a, 'Standard Specification for Ready-Mixed Concrete'.
      e. ASTM C140/C140M-18a, 'Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
      f. ASTM C143/C143M-15a, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
      g. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
      h. ASTM C172/C172M-17, 'Standard Practice for Sampling Freshly Mixed Concrete'.
      i. ASTM C173/C173M-16, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
      j. ASTM C192/C192M-18, 'Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
      k. ASTM C231/C231M-17a, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
      l. ASTM C260/C260M-10a(2016), 'Standard Specification for Air-Entraining Admixtures for Concrete'.
      m. ASTM C330/C330M-17a, 'Standard Specification for Lightweight Aggregates for Structural Concrete'.
      n. ASTM C494/C494M-17, 'Standard Specification for Chemical Admixtures for Concrete.
      o. ASTM C496/C496M-17, 'Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens'.
      p. ASTM C567/C567M-14, 'Standard Test Method for Determining Density of Structural Lightweight Concrete'.
      q. ASTM C595/C595M-18, 'Standard Specification for Blended Hydraulic Cements'.
      r. ASTM C618-19, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
      s. ASTM C1077-17, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
      t. ASTM C1157/C1157M-17, 'Standard Performance Specification for Hydraulic Cement'.
      u. ASTM D1751-18, 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
      v. ASTM E329-18: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
      w. ASTM E1155-14, 'Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers'.
   4. International Code Council (IBC) (2018 or latest approved edition):
      a. IBC Chapter 17, 'Special Inspections And Tests'.
         1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
         2) Section 1705, 'Required Special Inspection And Tests'.
            a) Section 1705.2, 'Steel Construction'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
      a. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
      b. Section 03 2100: ‘Reinforcement Bars’.
      c. Section 03 2116: ‘Epoxy-Coated Reinforcement Steel Bars'.
      d. Section 26 0526: 'Grounding And Bonding For Electrical Systems'.
      e. Section 33 3313: 'Sanitary Utility Sewerage'.
   2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
      b. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor’s foreman or whoever is in charge of ordering concrete.
      c. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
      d. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
      e. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
      f. Review 'Verification of Conditions' requirements.
      g. Review requirements for preparation of subgrade and aggregate base requirements.
      h. Review formwork requirements.
      i. Review approved mix design requirements, mix designs and use of admixtures.
      j. Review reinforcing bar submittals.
      k. Review installation schedule and placement of reinforcing bars.
      l. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
      m. Review joint layout plan for control and expansion joints, fillers for sidewalks, curbs, and gutters:
         1) Review jointing requirements.
      n. Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is 'green').
      o. Review concrete slab tolerances and corrective measures if tolerances not met.
      p. Review safety issues.
      q. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review requirements and frequency of testing and inspections.

B. Scheduling:
   1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.

1.4 SUBMITTALS

A. Action Submittals:
   1. Joint layout plan for control and expansion joints for sidewalks, curbs, and gutters for written approval before starting work on this Section.
   2. Shop Drawings:
      a. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
      b. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
      c. Provide bar schedules and bending details.
      d. Reinforced concrete walls shall be shown in scale elevation (scale at least one quarter inch to one foot). Details shall be in accordance with ACI rules.
      e. Show all formwork for concrete surfaces which are to remain exposed in the finished work.

B. Informational Submittals:
1. Certificates:
a. Installers:
1) Certification for National Ready Mixed Concrete Association (NRMCA).
2) Certification for ACI-certified Flatwork Finishers and Technicians.
2. Design Data:
a. Mix Design:
1) Furnish proposed mix design to Architect for review prior to commencement of Work.
a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140/C140M for hardened concrete properties.
b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.
b. Ready-Mix Supplier:
1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
a) Name of ready-mix batch plant.
b) Serial number of ticket.
c) Date and truck number.
d) Name of Contractor.
e) Name and location of Project.
f) Specific class or designation of concrete conforming to that used in Contract Documents.
g) Amount of concrete.
h) Amount and type of cement.
i) Total water content allowed by mix design.
j) Amount of water added at plant.
k) Sizes and weights of sand and aggregate.
l) Time loaded.
m) Type, name, manufacturer, and amount of admixtures used.
n) Design Data.
2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
a) Cement.
b) Aggregate.
c) Fly Ash.
3. Source Quality Control Submittals:
a. Concrete mix design: Submit mix designs to meet following requirements:
1) General purpose concrete type mix used for footings and for exterior concrete (excluding concrete paving) where not subject to freeze/thaw cycles and deicing or where higher strength is needed due to soil conditions.
2) 3000 psi (20.68 MPa) minimum at twenty-eight (28) days.
3) Water / Cementitious Material: 0.45 to 0.50 by weight.
4) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
5) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
b. Slump:
1) 4 inch (100 mm) slump maximum before addition of high range water reducer.
2) 8 inch (200 mm) slump maximum with use of high range water reducer.
3) Slump not required for Mix Type G.
c. Admixtures:
1) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
2) Fly ash: Amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty-five (25) percent of weight of cementations materials may used.
3) Chemical:
a) Specified accelerator or retarder may be used if necessary to meet environmental conditions.

b) Special additives to promote rapid drying concrete, or moisture vapor reduction (MVRA), may be used in interior concrete slabs on grade and elevated concrete decks that will receive flooring if necessary to meet construction schedules.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Pour Reports:
a) Provide report that records following information:
b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
d) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
e) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
f) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
g) Screeding method and equipment used.
h) Saw cut method and equipment used.
2) Testing and Inspection Reports:
a) Testing Agency Testing and Inspecting Reports of concrete.
3) Warranty. Submit rapid concrete drying or MVRA manufacturer warranties for concrete moisture vapor emission induced flooring failure and adhesion; ensure both have been completed in project’s name and registered with manufacturer.
a) Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of concrete. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
b) Provide stand-alone adhesion warranty matching duration of flooring adhesive or primer manufacturer's material defect warranty.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
1. Installers and Installation Supervisor:
a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
2. Ready-Mix Supplier:
a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
3. Testing Agencies:
a. Independent agency qualified according to ASTM C1077 and ASTM E329.
1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

B. Testing And Inspection:
1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Testing and Inspection on concrete:
a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:

1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Expansion Joint Filler Material:
a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage And Handling Requirements:
1. Expansion Joint Filler Material:
a. Store materials in a clean, dry area in accordance with manufacturer's instructions.
b. Protect materials during handling and application to prevent damage.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Aridus Admixture by US Concrete, Euless, TX www.us-concrete.com/aridus/.
b. BASF (Construction Chemicals Division), Cleveland, OH www.master-builders-solutions.basf.us/en-us.
c. Bonsal American, Charlotte, NC www.bonsal.com.
d. Concure Systems Admixture by Concure Systems, Phoenix, AZ www.ConcureSystems.com.
e. Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
f. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
g. Fritz-Pak Concrete Admixtures, Dallas, TX www.fritzpak.com.
h. GCP Applied Technologies, Cambridge, MA www.gcpat.com/construction/en-us.
i. ISE Logik Industries, Gulfport, MS www.iselogik.com.
j. Kryton International Inc,. Vancouver, British Columbia, Canada www.kryton.com.
k. L & M Construction Chemicals, Omaha, NE www.lmcc.com.
l. Larsen Weldcrete by Larsen Products Corp, Rockville, MD www.larsenproducts.com.
m. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
n. Unitex, Kansas City, MO www.unitex-chemicals.com.
o. U S Mix Products Co, Denver, CO www.usspec.com.
p. W R Meadows, Hampshire, IL www.wrmeadows.com.

B. Performance:
1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
2. Capacities:
a. For testing purposes, following concrete strengths are required:
1) At 7 days: 70 percent minimum of 28 day strengths.
2) At 28 days: 100 percent minimum of 28 day strengths.

C. Materials:
1. Hydraulic Cement: Meet requirements of ASTM C150/C150M, Type <**Insert Type**>.
a. Meet requirements of ASTM C595/C595M, Type <**Insert Type**>.
b. Meet requirements of ASTM C1157/C1157M, Type <**Insert Type**>.
2. Aggregates:
a. General:

1) Submit a letter on quarry's letterhead that certifies all aggregate for concrete complies with the requirements of this section. Material certificates which are submitted shall be signed by both the materials producer and the contractor, certifying that materials comply with or exceed requirements specified herein to the Architect, Civil and Structural Engineering Consultant and the Independent Testing Laboratory for review and approval.
2) Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.

b. Coarse:
1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
2) Aggregate shall be uniformly graded by weight.

c. Fine:
1) Meet requirements of ASTM C33/C33M.
2) Aggregate shall be uniformly graded by weight.

3. Water: Clear, apparently clean, and potable.
4. Admixtures And Miscellaneous:
a. Fly Ash:
1) Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.

b. Chemical:
1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
2) Air Entraining Admixture:
a) Meet requirements of ASTM C260/C260M.
b) Type Two Acceptable Products:
(1) Equal as approved by Architect before use. See Section 01 6200.
3) Water Reducing Admixture:
a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:
(1) Equal as approved by Architect before use. See Section 01 6200.
4) Water Reducing, Retarding Admixture:
a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:
(1) Equal as approved by Architect before use. See Section 01 6200.
5) High Range Water Reducing Admixture (Superplasticizer):
a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:
(1) Equal as approved by Architect before use. See Section 01 6200.
6) Non-Chloride, Non-Corrosive Accelerating Admixture:
a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:
(1) Equal as approved by Architect before use. See Section 01 6200.
7) Corrosion Inhibiting Admixture:
a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
b) Type Two Acceptable Products:
(1) Eucon CIA by Euclid.
(2) DCI or DCI-S by GCP Applied Technologies.
(3) Equal as approved by Architect before use. See Section 01 6200.

8) Alkali-Silica Reactivity Inhibiting Admixture:
   a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   b) Type Two Acceptable Products:
      (1) Eucon Integral ARC by Euclid.
      (2) RASIR by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
9) Viscosity Modifying Admixture (VMA):
   a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendation.
   b) Type Two Acceptable Products:
      (1) Equal as approved by Architect before use. See Section 01 6200.
10) Shrinkage Reducing Admixture (SRA):
   a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
   b) Type Two Acceptable Products:
      (1) Equal as approved by Architect before use. See Section 01 6200.
11) Rapid Drying Admixture in Interior Concrete Slabs on Grade:
   a) Admixture specifically designed to promote rapid drying of concrete.
   b) Type Two Acceptable Products:
      (1) Equal as approved by Architect before use. See Section 01 6200.
12) Moisture Vapor Reduction Admixture (MVRA):
   a) Liquid, inorganic, ASTM C494/C494M Type S Admixture free of volatile organic compounds (VOCs); specifically formulated to close capillary systems formed during concrete placement and to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
   b) Type Two Acceptable Products:
      (1) MVRA 900 by ISE Logik Industries: www.iselogik.com.
      (2) Concure Systems Admixture by Concure Systems, Phoenix, AZ www.ConcureSystems.com.
      (3) Equal as approved by Architect before use. See Section 01 6200.
13) Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties:
   a) Functioning by growth of crystals in capillary pores.
   b) Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 feet of head; provide test reports.
   c) Type Two Acceptable Products:
      (1) CWPA 800 by ISE Logik Industries: www.iselogik.com.
      (2) Krystol Internal Membrane (KIM) by Kryton: www.kryton.com.
      (3) Equal as approved by Architect before use. See Section 01 6200.

2.2 ACCESSORIES

A. Formwork:
   1. Meet requirements specified in Section 03 1113:

B. Bonding Agents:
   1. Type Two Acceptable Products:
      a. Acrylic Additive by Bonsal American.
      b. Day Chem Ad Bond (J-40) by Dayton Superior.
      c. Flex-Con by Euclid Chemical Co.
      d. Larsen Weldcrete by Larsen Products Corp.
      e. Everbond by L & M Construction Chemicals.
      f. MasterEmaco A 660 (formally Acryl 60) by BASF.
      g. U S Spec Multicoat by U S Mix Products.
      h. Intralok by W R Meadows.
      i. Equal as approved by Architect before use. See Section 01 6200.

C. Expansion Joint Filler:
1. Expansion Joint Filler Material:
a. Design Criteria:
1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
2) 1/2 inch (12.7 mm) thick.
3) Resilience:
a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
b. Type Two Acceptable Products:
1) Fiber Expansion Joint by W R Meadows, Hampshire, IL www.wrmeadows.com.
2) Equal as approved by Architect before installation. See Section 01 6200.

D. Finishing Material (Exposed Vertical Faces of Foundation and Retaining Walls):
1. Finishing Material available in multiple concrete shades to closely match concrete surface.
2. Type Two Acceptable Products:
a. Mixture of 1 part cement (using same cement as used in concrete foundations), 1 part sand with 95 percent passing #50 sieve.
b. RapidSet WunderFixx by CTS Cement Manufacturing Corporation, Cypress, CA www.rapidset.com.
c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Concrete Forms:
a. Verify dimensions and spot elevations for locations of forms for concrete footings, stem walls, building slabs, curbs, gutters, walkways, and drainage systems are correct before concrete is placed.
1) Notify Architect of incorrect dimensions or spot elevations in writing.
2) Do not place concrete until corrections are made and verified.

3.2 PREPARATION

A. Concrete Mixing:
1. General:
a. All concrete shall be machine mixed.
b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
c. Reliable system must be employed to insure that no less than predetermined amount of cement goes into each batch.
d. Re-tempering partly set concrete will not be permitted.
2. Transit Mix:
a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.
d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.

f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.

3. Cold Weather Concreting Procedures:
   a. General Requirements:
      1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
      2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
      3) Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
      4) Use no frozen materials or materials containing ice.
      5) See ACI 306.1 'Standard Specification for Cold Weather Concreting' for additional requirements.
4. Hot Weather Concreting Procedures:
   a. General:
      1) Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
      2) Cool aggregate and subgrades by sprinkling.
      3) Avoid cement over 140 deg F (60 deg C).
      4) Use cold mixing water or ice.
      5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.
      6) See ACI 305.1 'Specification for Hot Weather Concreting' for additional requirements.

B. Surface Preparation:
1. Earthwork Preparation:
   a. Aggregate base and subgrade:
      1) Prepare aggregate base as specified in Section 31 1123.
      2) Prepare natural soil subgrade as specified in Section 31 2213.
      3) Prepare fill subgrade as specified in Section 31 2323.
2. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
3. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section:
   a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

C. Removal:
1. Remove water and debris from space to be placed:

3.3 INSTALLATION

A. Placing Concrete:
1. General:
   a. Place as soon after mixing as possible.
   b. Deposit as nearly as possible in final position.
   c. No concrete shall be deposited in water.
   d. Placing of concrete shall be continuous until panel or section is complete.
   e. Compact concrete in forms by vibrating and other means where required.
      1) Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type G).
      2) Use and type of vibrators shall conform to ACI 309.
   f. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
   g. Consolidate concrete thoroughly.
   h. Do not embed aluminum in concrete.
   i. Do not use contaminated, deteriorated, or re-tempered concrete.
   j. Avoid accumulation of hardened concrete.
   k. Dusting with cement not permitted.
2. Footings:

a. Level top of finish footing and leave rough.
b. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches (1 200 mm) long.

3. Foundation Walls: Leave steel projecting where required for floor tie.
4. Exterior Slabs:
   a. For continuous placing and where shown on Drawings, saw cut one inch (25 mm) deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).
5. Joints:
   a. Control Joints (Contraction Joints):
      1) Form control joints with early-entry, dry-cut saws as soon as final trowel operations are complete, and joints can be cut without raveling.
      2) Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than one inch (25 mm).
      3) Control joints to be hand tooled in sidewalks, curbs and gutters, mow strips, and aprons.
      4) Table One:

Concrete Control Joint On-Center Spacing (+/-)		
Sidewalks	4 feet to 6 feet	1.2 meters to 1.8 meters
Curbs and Gutters	10 feet	3.0 meters
Mow Strips	3 feet to 5 feet	0.90 meters to 1.50 meters
Flat Drainage Structures	10 feet	3 meters
Retaining Walls w/guardrails	Align with posts	
Retaining Walls w/chain link fencing	Align with posts	

   b. Expansion Joints:
      1) Expansion joints in Concrete Paving are specified in Section 32 1313.
      2) Install so top of expansion joint material is 1/4 inch (6 mm) below finished surface of concrete.
      3) No expansion joint required between curbs and sidewalks parallel to curb.
      4) Provide expansion joints at ends of exterior site concrete elements that are perpendicular to and terminate at curbs, building foundations or other concrete elements (i.e. sidewalks, mow strips, aprons).
      5) Provide expansion joints between sidewalks that are parallel, and adjacent, to storage building or main building.
      6) Provide expansion joints around perimeter of concrete slab on grade at mechanical enclosure, around perimeter of slab on grade at dumpster enclosure and at top and bottom of exterior stairs.
      7) Table Two:

Concrete Expansion Joint (Isolation) On-Center Spacing (+/-)		
Sidewalks, Curbs and Gutters	40 feet to 100 feet	12 meters to 30 meters
Mow Strips and Aprons	20 feet to 40 feet	6 meters to 12 meters
Flat Drainage Structures	50 feet	15 meters
Retaining Walls w/guardrails	36 feet	11 meters
Retaining Walls w/chain link fencing	50 feet	15 meters

      8) Seal expansion joints as specified in Section 07 9213 for following areas:
         a) Between entryway slabs and building foundations.
         b) Between sidewalks and building foundations.
         c) Within curbs and gutters.
         d) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
      9) Expansion joints are not required to be sealed for following areas:
         a) Within aprons and where apron abuts sidewalks.
         b) Within mow strips and where mow strip abuts building foundation and sidewalks.
         c) Within sidewalks.

6. Anchor Bolts:
   a. Place anchor bolts not tied to reinforcing steel immediately following leveling of concrete. Reconsolidate concrete around bolt immediately after placing bolt.
   b. Do not disturb bolts during finishing process.

B. Finishing:
   1. Interior Concrete Flatwork:
      a. Screed Concrete.
      b. Float Finish:
         1) Float as soon after screeding as possible.
         2) Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
         3) Re-straighten, cutting down high spots and filling low spots.
         4) Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
      c. Trowel Finish:
         1) Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
         2) Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
         3) Continue troweling passes and re-straightening with 10 foot (3 meter) highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
         4) Apply burnished, burned-out trowel finish.
   2. Exterior Concrete Flatwork:
      a. Curb, Gutter, Sidewalks, Mow Strips, Flat Drainage Structures, Stairs, And Miscellaneous:
         1) After completion of final floating, performed immediately after screeding and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
            a) Provide fine hair finish where grades are less than 6 percent 1-1/4 inch (32 mm).
            b) Provide rough hair finish where grades exceed 6 percent 1-1/4 inch (32 mm).
            c) Broom finish, by drawing broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide fine line texture acceptable to Architect. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
            d) On inclined slab surfaces, provide coarse, non-slip finish by scoring surface with stiff-bristled broom, perpendicular to line of traffic. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
            e) Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.
            f) Round edges exposed to public view to 1/2 inch (13 mm) radius, including edges formed by expansion joints.
            g) Remove edger marks.
   3. Vertical Surfaces (Exposed To View Vertical Surfaces, Exposed Retaining Walls, Exposed Foundation Walls, Concrete Piers, and etc.):
      a. General:
         1) Finishing Material to fill and smooth interior and exterior concrete surface defects such as spalls, gouges, cracks, dents, chips, bug holes, stone pockets, honeycombs, voids and other defective areas.
         2) Chamfer lines shall be finished.
      b. Surface Preparation:
         1) Formwork shall be stripped from concrete while concrete is still 'green'.
         2) Concrete surface to be finished immediately after formwork has been removed.
            a) Immediately after removing forms, remove joints, marks, bellies, projections, loose materials and other irregularities, and cut back metal ties from surfaces to be exposed.
            b) Repair defective areas and voids or stone pockets with Finishing Material and smooth to even surface matching surrounding undamaged area.

c. Smooth Rubbed Finish:
1) Thoroughly wet with water, apply Finishing Material in thin layer, rub in circular motion to smooth uniform finish.
2) Entire surface shall be protected from rapid drying for not less than three (3) days.
3) Surfaces shall be cleaned of drip marks and discolorations.
4) Concrete surface shall be left with clean, neat, uniform finish, free from form markings and shall be uniform in color and texture.

C. Curing:
1. Membrane Concrete Curing:
a. As specified in Section 09 3923 'Membrane Concrete Curing'.
b. Follow Manufacturer's written instructions for preparation, application rates, placement, and cleanup:
1) Apply as soon as troweling on interior concrete is complete.
2) Apply as soon as brooming or finishing of exterior concrete is complete.
3) Spraying application is required.
4) Do not dilute or thin product.
5) Do not apply when temperature of concrete is less than 40 deg F (4.4 deg C).
6) Apply uniformly without puddles or ponding.
7) Do not apply before bleed water has dissipated.
8) Do not apply over standing water.
c. Maximum Variation Tolerances:
1) Table Three:

Maximum Variation Tolerances		
Thickness, standard	plus 3/8 inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm
Thickness, footings	minus 0 inch	minus 0 mm
Plan, 0 - 20 feet	1/2 inch	12.7 mm
Plan, 40 feet or greater	3/4 inch	19 mm
Plan, footings	plus 1/2 inch	plus 12.7 mm
Eccentricity, footings	2 inch maximum standard, 1/2 inch at masonry	50 mm maximum standard, 12.7 mm at masonry
Openings, size	minus 1/4 inch, plus one inch	minus 6 mm, plus 25.4 mm
Openings, location	plus / minus 1/2 inch at center	plus / minus 12.7 mm at center
Plumb	1/2 inch maximum	12.7 mm maximum
Consecutive Steps, treads	1/4 inch	6 mm
Consecutive Steps, risers	1/8 inch	3 mm
Flight of Stairs, treads	1/4 inch in total run	6 mm in total run
Flight of Stairs, risers	1/8 inch in total height	3 mm in total height

2. Local Flatness / Levelness of Interior Slabs:
a. Carpet and Tile Areas:
1) Specified Overall Value of F_F25 / F_L20 and Minimum Local Value of F_F15 / F_L13 when tested in accordance with ASTM E1155.
2) Specified Overall Value of F_F30 / F_L20 and Minimum Local Value of F_F18 / F_L13 when tested in accordance with ASTM E1155 in ceramic, resilient or vinyl tiled areas.
3) Used on building slabs to be covered by carpet and tile as shown on Contract Drawings. Verify and coordinate with Finish Schedule.
4) Remedy For Out-of-Tolerance Building Slabs:
a) Sections of building slabs which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
b) Remove and replace sections of slabs measuring outside specified correctable tolerances.
c) Carpet areas: If floor leveling compounds or concrete patching compounds are required to bring floor into specified tolerances, they will be provided by Owner in conjunction with carpet installation and back-charged to Contractor.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
   a. Quality Control is sole responsibility of Contractor:
      1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
         a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars and Bolts:
   a. Testing Agency shall provide inspections will include following:
      1) Bolts:
         a) Inspection of bolts to be installed in concrete prior to and during placement of concrete.
         b) Periodic inspection of anchors installed in hardened concrete.
      2) Reinforcement Bars:
         a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
         b) Inspect that all reinforcement bars are be positively identified as to heat number and mill analysis.
         c) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.
3. Concrete:
   a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
   b. Testing and inspections, if performed, will include following:
      1) Periodic inspection verifying use of required design mix.
      2) Inspection of reinforcing bars and anchor bolts before placement of concrete for proper installation.
      3) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
      4) Inspection of concrete placement for proper application techniques.
         a) Steel tools are not to be used on exterior concrete.
      5) Periodic inspection for maintenance of specified curing temperature and techniques:
         a) Steel tools are not to be used on exterior concrete. Bull floating and finish floating is to be performed with magnesium or wood floats.
      6) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
         a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
      7) Periodic inspection of concrete finishing operations for proper finishing techniques.
      8) Periodic inspection for placement of specified curing compounds.
   c. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
      1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
         a) Slump: ASTM C143/C143M, test each time set of compressive specimens are made.
         b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
         c) Concrete Temperature: Test each time set of compressive specimens are made.
         d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.
      2) Concrete floor flatness and floor levelness of interior slabs as per ASTM E1155.
      3) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.

d. Compression Test Specimen: ASTM C31/C31M, one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
e. Compressive Strength Tests: ASTM C39/C39M:
   1) Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd (4 cu m), but less than 50 cu. yd (38 cu m), plus one (1) set for each additional 50 cu. yd (38 cu m) or fraction thereof.
   2) One (1) specimen tested at seven (7) days, two (2) specimens tested at twenty-eight (28) days, and one (1) specimen retained in reserve for later testing if required.
   3) If strength of field-cured cylinders is less than eighty-five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
   4) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi (3.45 MPa).
f. Samples:
   1) Fresh Concrete: ASTM C172/C172M except modified for slump to comply with ASTM C94/C94M.
      a) Slump: ASTM C143/C43M, test each time set of compressive specimens are made.
      b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight.
      c) Concrete Temperature: Test each time set of compressive specimens are made.
      d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

3.5 CLEANING

A. General:
   1. Curing:
      a. Clean tools, equipment as directed by Manufacturer's instructions.

3.6 PROTECTION

A. Concrete:
   1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.
   2. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.
   3. Protect interior concrete floors from stains, paint, mortar and other construction activities.

B. Curing:
   1. Restrict foot or vehicle traffic as curing membrane dries as recommended be Manufacturer.

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DIVISION 04: MASONRY

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SECTION 04 0519

MASONRY ANCHORS AND INSERTS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Embedded Anchors for masonry.
   2. Post Installed Drilled Anchors for masonry:
      a. Adhesive anchors and inserts.
      b. Drilled-in mechanical anchors (expansion bolts).
      c. Screw anchors.
   3. Masonry anchors and inserts not specified elsewhere.

B. Related Requirements:
   1. Section 01 0000: ‘General Requirements’:
      a. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
      b. Section 01 4000: ‘Quality Requirements’ for administrative and procedural requirements for quality assurance and quality control.
      c. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   2. Section 04 0501: ‘Common Masonry Requirements’ for installation of masonry anchors and inserts.
   3. Section 04 0521: ‘Masonry Veneer Ties’.
   4. Section 04 0523: ‘Masonry Accessories’.
   5. Sections Under 04 2000 Heading: ‘Unit Masonry’ for masonry anchors and inserts used in Unit Masonry.

1.2 REFERENCES

A. Reference Standards:
   1. American Concrete Institute:
      a. ACI 355.4-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary'.
      b. ACI 355.4M-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary (Metric)'.
      c. ACI 548.12-12, 'Specification for Bonding Hardened Concrete and Steel to Hardened Concrete with an Epoxy Adhesive'.
   2. ASTM International:
      a. ASTM A36/A36M-14, ‘Standard Specification for Carbon Structural Steel’.
      b. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile Strength'.
      c. ASTM A563-15, ‘Standard Specification for Carbon and Alloy Steel Nuts'.
      d. ASTM E488/E488M-18, ‘Standard Test Methods for Strength of Anchors in Concrete Elements’.
      e. ASTM F3125/F3125-15a, ‘Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions'.
   3. International Code Council (IBC) (2018 or latest edition available):
      a. Chapter 17, ‘Special Inspections And Tests’:
         1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501.

B. Scheduling:
   1. Inspection shall be performed according to Manufacturer's submitted ICC ES Evaluation Report.
   2. Notify Testing Agency and Architect twenty-four (24) hours minimum before testing Post Installed Drilled Anchors. Coordinate testing schedule with mortar and grout as specified in Section 04 0501.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Post Installed Anchors:
         1) Manufacturer's product literature for each item.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Post Installed Anchors:
         1) Provide current Manufacturer's applicable ICC ESR Evaluation Reports and ICC ES Acceptance Criteria showing conformance for each item.
   2. Manufacturer's Instructions:
      a. Post Installed Anchors:
         1) Manufacturer's published installation instructions for each item.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Post Installed Anchors:
            a) Testing Agency Inspecting Reports of Anchors.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Having sufficient capacity to produce and deliver required materials without causing delay in work.
   2. Installer:
      a. Acceptable to Manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.

B. Testing and Inspection.
   1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will provide Testing and Inspection for Post Installed Anchors:
      a. Owner will employ testing agencies to perform testing and inspection for anchors as specified in Field Quality Control in Part 3 of this specification.
         1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
         2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
   1. Store materials protected from exposure to harmful weather conditions and as directed by manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufactured Units:
   1. General:
      a. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Drawings.
      b. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
      c. Conform to requirements of ASTM F3125/F3125M for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.

B. Embedded Anchor Bolts:
   1. Class Two Quality Standard. See Section 01 6200 for definition.
      a. Meet following design criteria requirements:
         1) Bent-bar Anchors: J and L-Bolts (threaded steel rods with hooks embedded into masonry):
            a) Non-headed type threaded 2 inches (50 mm) minimum conforming to material requirements of ASTM A36/A36M.
            b) Anchor hook to project 2 inch (50 mm) minimum including bolt diameter.
         2) Headed Bolts:
            a) Headed type threaded 2 inch (50 mm) minimum conforming to requirements of ASTM A307, Grade A.

C. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
   1. Design Criteria:
      a. Design loads are determined from testing minimum of five (5) specimens in accordance with ASTM E488 under stresses and conditions that represent intended use.
         1) Allowable stress design values are limited to twenty (20) percent of average tested anchor bolt strength.
         2) Using strength design provisions, nominal design strengths are limited to sixty-five (65) percent of average tested strength.
      b. Effective embedment length: 2 inch (50 mm) minimum.
   2. Adhesive Anchors:
      a. Cartridge Injection Adhesive Anchors.
      b. Products shall have current ICC ES Evaluation report conforming to current ICC ES Acceptance Criteria ICC ES AC 58 for masonry.
      c. Rod diameter and embedment length as indicated on Contract Drawings.
      d. Type Two Acceptable Products:
         1) HIT-HY 70 by Hilti Fastening Systems, Tulsa, OK; www.us.hilti.com.
         2) SET Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
         3) Equal as approved by Architect before installation. See Section 01 6200.
   3. Drilled-In Mechanical Anchors (Expansion Bolts):
      a. Products shall have current ICC ES Evaluation report conforming to current ICC ES Acceptance Criteria ICC ES AC 01 for masonry.
      b. Type Two Acceptable Products:
         1) Kwik Bolt 3 by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
         2) Wedge-All by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.

3) Equal as approved by Architect before installation. See Section 01 6200.

4. Screw Anchors:
   a. Provide anchors with length identification markings conforming to ICC ES AC 106 for masonry.
   b. Type Two Acceptable Products:
      1) Titen HD by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
      2) Equal as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
      a. Base Material Strength:
         1) Unless otherwise specified, do not drill holes in masonry until mortar, or grout has achieved full design strength.
      b. Identify position of reinforcing steel and other embedded items before drilling holes for anchors.
      c. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
      d. Take precautions as necessary to avoid damaging, electrical and telecommunications conduit, and gas lines.
      e. Notify Architect/Engineer if reinforcing steel or other embedded items are encountered during drilling.

3.2 PREPARATION

A. Surface Preparation:
   1. Clean surfaces prior to installation.
   2. Prepare surface in accordance with Manufacturer's written instructions.

3.3 INSTALLATION

A. Embedded Anchor Bolts:
   1. Embed Headed and J Bolts larger than 1/4 inch (6.4 mm) diameter in grout that is placed in accordance with 'Grout Placement' as specified in Installation requirements in Part 3 of this specification. Anchor bolts of 1/4 inch (6.4 mm) diameter or less are permitted to be placed in grout.
   2. For anchor bolts placed in top of grouted cells and bond beams, maintain clear distance between bolt and face of masonry unit of at least 1/4 inch (6.4 mm) when using fine grout and at least 1/2 inch (12.7 mm) when using coarse grout.
   3. For anchor bolts placed through face shell of hollow masonry unit, drill hole that is tight-fitting to bolt or provide minimum clear distance:
   4. For portion of bolt that is within grouted cell, maintain clear distance between bolt and face of masonry unit and between head or bent leg of bolt and formed surface of grout of at least 1/4 inch (6.4 mm) when using fine grout and at least 1/2 inch (12.7 mm) when using course grout.
   5. Place anchor bolts with clear distance between parallel anchor bolts not less than nominal diameter of anchor bolt, nor less than 1 inch (25 mm).

B. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
   1. General:
      a. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits.
      b. Unless otherwise shown on Contract Drawings, drill holes perpendicular to masonry surface.

c. Where anchors are to be installed in cored holes, use core bits with matched tolerances specified by Manufacturer. Cores holes may only be used if acceptable to Manufacturer.
d. Perform anchor installation in accordance with Manufacturer's published instructions.

2. Adhesive Anchors:
   a. Clean holes in accordance with Manufacturer's published instructions before installation of adhesive. Follow Manufacturer's instructions to ensure proper mixing of adhesive components.
   b. Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive. Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
   c. Remove excess adhesive from surface.
   d. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
   e. Observe Manufacturer's instructions with respect to installation temperatures for adhesive anchors. Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.
3. Drilled-in Mechanical Anchors (Expansion Bolts):
   a. Protect threads from damage during anchor installation.
   b. Set anchors to Manufacturer's recommended torque, using torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.
4. Screw Anchors:
   a. Protect threads from damage during anchor installation.
   b. Set anchors to Manufacturer's recommended torque, using torque wrench.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
      a. Quality Control is sole responsibility of Contractor.
         1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
            a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
   2. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
      a. Certified Inspector from Testing Agency shall verify procedures used for installation of all post installed anchors and monitor their installation for compliance with manufacturer's requirements.
      b. Testing: Ten (10) percent of each type and size of drilled-in anchor shall be proof loaded by Testing Agency's testing laboratory or as directed by Architect. Adhesive anchors will not be torque tested unless otherwise directed by Architect. If more than ten (10) percent of tested anchors fail to achieve specified torque or proof load within limits defined on Drawings, all anchors of same diameter and type as failed anchors shall be tested at Contractors expense, unless otherwise instructed by Architect.
         1) Torque will be applied with calibrated torque wrench.
         2) Proof loads will be applied with calibrated hydraulic ram. Displacement of adhesive anchors at proof load shall not exceed D/10, where D is nominal anchor diameter.

B. Non-Conforming Work:
   1. Remove and replace misplaced or malfunctioning anchors.
   2. Fill empty anchor holes and patch failed anchor locations with high-strength, non-shrink, non-metallic grout acceptable to Architect.
   3. Anchors that fail to meet proof load or installation torque requirements will be regarded as malfunctioning.
   4. Repair damage to adjacent materials caused by product installation.

3.5 CLEANING

A. Waste Management:
   1. Disposal of rubbish, debris, and packaging materials.

3.6 PROTECTION

A. General:
   1. Protect installed products from damage during construction.

END OF SECTION

DIVISION 05: METALS

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SECTION 05 0523

METAL FASTENING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of structural metal-to-metal, wood-to-metal, and wood-to-wood bolts used on Project.
   2. Requirements and standards for site welded metal-to-metal connections.

B. Related Requirements:
   1. Section 03 1511: 'Concrete Anchors And Inserts' for cast-in-place and drilled-in anchor bolts.
   2. Furnishing and installing of structural bolts specified under Section concerned.
   3. Performance of welding specified under Section concerned.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / American Welding Society:
      a. ANSI/AWS D1.1/D1.1M:2015, ‘Structural Welding Code - Steel’.
      b. ANSI/AWS D1.3/D1.3M:2018, ‘Structural Welding Code - Sheet Steel’.
   2. ASTM International:
      a. ASTM A36/A36M-14, ‘Standard Specification for Carbon Structural Steel'.
      b. ASTM A307-14, ‘Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength'.

1.3 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but not limited to the following:
   1. Welders shall be certified 30 days minimum before beginning work on Project. If there is doubt as to proficiency of welder, Architect may require welder to take another test, at no expense to Owner. Certification shall be by Pittsburgh Laboratories or other authority approved by Architect.

B. Certifications:
   1. Maintain welder's certifications on job-site.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Materials:
   1. Bolts And Threaded Fasteners:
      a. Anchor Rods For Steeple Base Connections: Conform to requirements of ASTM A36/A36M.
      b. Bolts: Conform to requirements of ASTM A307, Grade A.

2.2 ACCESSORIES

A. Arc-Welding Electrodes: Type E70XX AWS Iron and Steel Arc-welding electrodes and meeting current AISC Specifications.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Welding shall meet requirements of ANSI / AWS D1.1 and D1.3.

END OF SECTION

SECTION 05 1223

STRUCTURAL STEEL FOR BUILDINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:
1. Section 03 3111: 'Cast-In-Place Structural Concrete'.
2. Section 05 0503: 'Shop-Applied Metal Coatings' for quality of priming.
3. Section 05 0523: 'Metal Fastening' for quality of welding.
4. Section 09 9113: 'Exterior Painted Galvanized Metal' for preparing and painting new exterior exposed galvanized metal surfaces.

1.2 REFERENCES

A. Reference Standards:
1. American Society For Testing And Materials:
   a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.
   b. ASTM A53/A53M-18, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
   c. ASTM A500/A500M-18, 'Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes'.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Materials:
1. Structural Tubing: Meet requirements of ASTM A500/A500M, Grade B.
2. Miscellaneous Steel:
   a. Meet requirements of ASTM A36/A36M for the following:
      1) Miscellaneous structural steel.

B. Fabrication:
1. After fabrication and before shop priming, hot-dip or mechanically galvanize to be installed in following:
   a. Bollards.
   b. Lintels in exterior walls.
   c. Satellite dish base.
2. Shop prime steel provided under this Section.

PART 3 - EXECUTION: Not Used

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DIVISION 06: WOOD, PLASTICS, AND COMPOSITES

06 1000 ROUGH CARPENTRY

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SECTION 06 1011

WOOD FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.

B. Related Requirements:
   1. Section 03 1511: 'Concrete Anchors and Inserts' for Quality of Anchors and Inserts.
   2. Section 05 0523: 'Metal Fastenings' for Quality of bolts used for Rough Carpentry.
   3. Furnishing and installing of other fasteners are specified in individual Sections where installed.

1.2 REFERENCES

A. Reference Standards;
   1. ASTM International:
      a. ASTM A153/A153M-16a, ‘Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware’.
      b. ASTM D3498-18, ‘Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems’.
      c. ASTM F1667-18a, ‘Standard Specification for Driven Fasteners: Nails, Spikes, and Staples’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature on framing anchors and powder actuated fasteners.
   2. Shop Drawings:
      a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
         1) Adjusted fastener spacing where using proposed fasteners and,
         2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
      b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
      c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description:
   1. Nail Terminology:

a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

B. Materials:
1. Wood fastener list:
   a. Provide VMR Suppliers with wood fastener list.
2. Fasteners:
   a. General:
      1) Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
   b. Nails:
      1) Meet requirements of ASTM F1667.
      2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
   c. Wood Screws:
      1) SDS Screws:
         a) Category Four Approved Products. See Section 01 6200 for definitions of categories.
            (1) SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
      2) All Other: Standard type and make for job requirements.
   d. Powder-Actuated Fasteners:
      1) Type One Quality Standard: Hilti X-DNI 62P8.
      2) Manufacturers:
         a) Hilti, Tulsa, OK www.us.hilti.com.
         b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.
         c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.
3. Adhesives:
   a. Construction Mastics:
      1) Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498.
      2) Use phenol-resorcinol type for use on pressure treated wood products.
4. Framing Anchors:
   a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc-coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.
   b. Type Two Acceptable Products:
      1) KC Metals Inc, San Jose, CA www.kcmetals.com.
      2) Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
      3) United Steel Products Co Inc (USP), Montgomery, MN www.uspconnectors.com.
      4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 ERECTION

A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

B. Provide washers with bolt heads and with nuts bearing on wood.

END OF SECTION

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SECTION 06 1100

WOOD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wood framing and blocking as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Miscellaneous structural steel elements.
   2. Roof related blocking, wood nailers, and curbs.
   3. Structural composite lumber.
   4. Wood panel product sheathing.

C. Related Requirements:
   1. Section 05 1223: 'Structural Steel For Buildings' for furnishing of miscellaneous structural steel.
   2. Section 06 0573: 'Preservative Wood Treatment' for quality of preservative wood treatment.
   3. Section 06 1636: 'Wood Panel Product Sheathing' for:
      a. Pre-installation conference held jointly with Section 06 1100.
   4. Section 06 1712: 'Structural Composite Lumber - SCL'.
   5. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.
   6. Sections in Division 07: Roofing membranes for related blocking, wood nailers, and curbs.

1.2 REFERENCES

A. Association Publications:
   1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
      a. Voluntary Product Standard:
         1) PS 20-15, 'American Softwood Lumber Standard'.
   2. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
      a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.

B. Reference Standards:

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference held jointly with Section 06 1636.
      a. Schedule pre-installation conference immediately before beginning framing work.
      b. In addition to agenda items specified in Section 01 3100, review following:
         1) Nails and nailing requirements.
         2) Connections.
   2. Participate in pre-installation conference held jointly with Section 08 4113.
      a. Schedule pre-installation conference for one (1) week before scheduled installation of storefront system.
      b. In addition to agenda items specified in Section 01 3100, review following:
         1) Rough opening requirements.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Protect lumber and sheathing and keep under cover in transit and at job site.
   2. Do not deliver material unduly long before it is required.

B. Storage And Handling Requirements:
   1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
   2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 SUPPLIERS

A. Suppliers:
   1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
      a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
         1) Office: (801) 224-0541.
         2) Mobile: (801) 376-9853.
         3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
      b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
         1) Office: (800) 962-8780.
         2) FAX: 801-782-9652.
         3) E-Mail: tom@thomasforest.com.
      c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
         1) Office: (800) 662-3612.
         2) Cell: NA.
         3) FAX: (503) 238-2663.
         4) E-Mail: mrunning@shelter-products.com.

2.2 MATERIALS

A. Wood Framing List:
   1. Provide Category Three Approved Suppliers with wood framing list.

B. Dimension Lumber:
   1. Design Criteria:
      a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
      b. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
      c. Lumber 2 inches (50 mm) or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
      d. Preservative Treated Plates / Sills:

1) 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
2) 2x6 (38 mm by 140 mm) And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).

C. Posts, Beams, And Timbers 5 Inches by 5 Inches (125 mm by 125 mm) And Larger:
1. Design Criteria:
a. No. 1 or better Douglas Fir or Southern Pine.

D. Lumber Ledgers:
1. Design Criteria:
a. No. 2 Douglas Fir-Larch, or Southern Pine.

E. See Contract Drawings for additional requirements.

2.3 ACCESSORIES

A. Blocking:
1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch (13 mm).

B. Furring Strips:
1. Utility or better.

C. Sill Sealer:
1. Closed-cell polyethylene foam, 1/4 inch (6 mm) thick by width of plate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill, and ledger plates, door and window subframes and bucks, etc.

B. Interface With Other Work:
1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.
2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.
3. Beams And Girders:
a. Built-Up Members:
1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches (300 mm) on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches (300 mm) on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
b. Pre-Fabricated Members:
1) Solid glu-lam, LVL, LSL, or PSL members may be used in place of built-up 2x (38 mm) framing members. Size shall be same as built-up member.
2) Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.

c. Wood shims are not acceptable under ends.
d. Do not notch framing members unless specifically shown in Drawing detail.

4. Nailing:
   a. Stud to plate (coordinate with Contract Drawings):

2 by 4 inch nominal	38 by 89 mm	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	38 by 140 mm	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	38 by 184 mm	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	38 by 235 mm	End nail, five 16d OR toe nail, six 8d
1-3/4 by 5-1/2 inch LVL	44 by 140 mm LVL	End nail, three 16d OR toe nail, four 8d
1-3/4 by 7-1/4 inch LVL	44 by 184 mm LVL	End nail, four 16d OR toe nail, six 8d
1-3/4 by 9-1/4 inch LVL	44 by 235 mm LVL	End nail, five 16d OR toe nail, six 8d
1-3/4 by 11-1/4 inch LVL	44 by 286 mm LVL	End nail, six 16d OR toe nail eight 8d

   b. Top plates: Spiked together, 16d, 16 inches (400 mm) on center.
   c. Top plates: Laps, lap members 48 inches (1200 mm) minimum and nail with 16d nails 4 inches (100 mm) on center
   d. Top plates: Intersections, three 16d.
   e. Backing And Blocking: Three 8d, each end.
   f. Corner studs and angles: 16d, 16 inches (400 mm) on center.

C. Roof And Ceiling Framing:
   1. Place with crown side up at 16 inches (400 mm) on center unless noted otherwise.
   2. Install structural blocking and bridging as necessary and as described in Contract Documents.
   3. Special Requirements:
      a. Roof And Ceiling Joists: Lap joists 4 inches (100 mm) minimum and secure with code approved framing anchors.
      b. Roof Rafters And Outlookers:
         1) Cut level at wall plate and provide at least 2-1/2 inches (64 mm) bearing where applicable. Spike securely to plate with three 10d nails.
         2) Attach to trusses or other end supports with framing anchors described in Contract Documents.
         3) Provide for bracing at bearing partitions.
   4. Installation of Structural Composite Lumber:
      a. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
      b. Install permanent bracing and related components before application of loads to members.
   5. Secure headers and header backing to structure as described in Contract Documents.

D. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers) for Wood Framing):
   1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
   2. Furnish and install back blocking in wood framing required for joints in gypsum wallboard.
      a. Attach back blocking at trusses, stick framing, or walls with two 10d nails in each end of each piece of blocking.

END OF SECTION

SECTION 06 1636

WOOD PANEL PRODUCT SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wood panel product sheathing required for walls, roofs, and floors as described in Contract Documents.

B. Related Requirements:
   1. Section 01 0000: 'General Requirements':
      a. Section 01 1200: 'Multiple Contracts Summary'.
      b. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   2. Section 06 1100: 'Wood Framing' for:
      a. Pre-installation conference held jointly with Section 06 1636.

1.2 REFERENCES

A. Association Publications:
   1. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
      a. Voluntary Product Standard DOC PS 1-09. 'Structural Plywood'.
      b. Voluntary Product Standard DOC PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
   2. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.
      a. Performance Rated Panels, 'Product Guide' (for products bearing the APA trademark) December 2011.
      b. Voluntary Product Standard:
         1) PS 1-09. 'Structural Plywood'.
         2) PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
      c. PRP-108 'Performance Standards and Policies for Structural-Use Panels'.
   3. TECO, Cottage Grove, WI www.tecotested.com.
      a. TECO PRP-133: ('Fire Rated Assemblies – OSB substitution for plywood in UL fire-rated assemblies that specify plywood).

B. Reference Standards:

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 06 1100.
   2. In addition to agenda items specified in Section 01 3100 and Section 06 1100, review following:
      a. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control inspection required of this section.

B. Scheduling:
   1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing sheathing.

1.4 SUBMITTALS

A. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
a) Testing Agency Inspection Reports of sheathing.

1.5 QUALITY ASSURANCE

A. Testing and Inspection:
1. Owner will provide Testing and Inspection for inspection of sheathing:
a. Owner will employ testing agencies to perform inspection for sheathing as specified in Field Quality Control in Part 3 of this specification.
1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
2) See Section 01 1200: 'Multiple Contract Summary'.
b. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control.
1) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Do not deliver material unduly long before it is required.
2. Protect sheathing and keep under cover in transit and at job site.

B. Storage And Handling Requirements:
1. Store sheathing on level racks and keep free of ground.
2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
1) Office: (801) 224-0541.
2) Mobile: (801) 376-9853.
3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
1) Office: (800) 962-8780.
2) FAX: 801-782-9652.
3) E-Mail: tom@thomasforest.com.
c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
1) Office: (800) 662-3612.
2) Cell: NA.
3) FAX: (503) 238-2663.
4) E-Mail: mrunning@shelter-products.com.

2.2 MATERIALS

A. Performance:
1. Design Criteria:
a. Meet requirements of PS 1, PS 2, or PRP-133 (TECO). Except where plywood is specifically indicated on Contract Drawings, oriented strand board (OSB) is acceptable.

B. Sheathing:
1. Wood framing list:
a. Provide Category Three Approved Suppliers with wood framing list.
2. Sheathing:
a. Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.
b. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.
c. Sheathing 23/32 inch (18.3 mm) thick and thicker used for single-layer subflooring shall be tongue and groove.
d. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
e. Minimum span ratings for given thicknesses shall be as follows:

Thickness	Span Rating
3/8 inch	24 / 0
7/16 inch nominal	24 / 16
15/32 inch actual	32 / 16
1/2 inch nominal	32 / 16
19/32 inch actual	40 / 20
5/8 inch nominal	40 / 20
23/32 inch actual	48 / 24
3/4 inch nominal	48 / 24

2.3 ACCESSORIES

A. Nails:
1. As indicated on Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Top of nail heads shall be flush with sheathing surface.
2. Use of edge clips to provide spacing between sheathing panels is acceptable.

B. Roof Sheathing:
1. Placing:
a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
b. Provide 1/8 inch (3 mm) space between sheets at end and side joints.
c. Stagger panel end joints.
d. Sheathing shall be continuous of two spans minimum.
2. Edge Bearing and Blocking:
a. As indicated on Contract Drawings.
3. Nail Spacing:
a. As indicated on Contract Drawings.

b. Place nails at least 3/8 inch (9.5 mm) in from edge.

4. Thickness:
   a. As indicated on Contract Drawings.
5. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches (600 mm) unless support is provided under all edges.

3.2 FIELD QUALITY CONTROL

A. Field Inspections:
   1. Sheathing:
      a. General:
         1) Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
         2) Quality Control is sole responsibility of Contractor as specified in Section 01 4523 'Testing And Inspection Services'.
      b. For walls and roof areas where nail spacing is 4 inches (100 mm) and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

3.3 PROTECTION

A. Protect roof sheathing from moisture until roofing is installed.

END OF SECTION

SECTION 06 1712

STRUCTURAL COMPOSITE LUMBER: SCL

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Laminated Veneer Lumber (LVL).
   2. Parallel Strand Lumber (PSL).
   3. Laminated Strand Lumber (LSL).

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for installation, securing, bracing, etc.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM D2559-12a(2018), ‘Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior Exposure Conditions'.
      b. ASTM D5456-18, ‘Standard Specification for Evaluation of Structural Composite Lumber Products'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Certificates: Provide certification confirming that material structural design properties and design stresses have met or exceed requirements shown on Drawings.
   2. Test And Evaluation Reports: Copies of ICC or CCMC reports showing approval materials.
   3. Qualification Statements:
      a. Alternate Supplier(s):
         1) Provide name and contact information.
         2) Provide Qualification documentation as requested.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:
   1. Store members on job site in accordance with Manufacturer's instructions.
   2. Keep dry and provide supports to keep members off floor or ground.
   3. Split plastic wrappers of members stored encased in plastic on bottom side to allow for air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
   1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:

a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
   1) Office: (801) 224-0541.
   2) Mobile: (801) 376-9853.
   3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
   1) Office: (800) 962-8780.
   2) FAX: 801-782-9652.
   3) E-Mail: tom@thomasforest.com.
c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
   1) Office: (800) 662-3612.
   2) Cell: NA.
   3) FAX: (503) 238-2663.
   4) E-Mail: mrunning@shelter-products.com.

B. Acceptable Manufacturers:
1. Boise Cascade Corp, Boise, ID www.bc.com.
2. Georgia-Pacific Corp, Atlanta, GA www.gp.com.
3. Jager Industries Inc, Calgary, AB www.jagerbuildingsystems.com.
4. Louisiana Pacific Corp, Portland, OR www.lpcorp.com.
5. Roseburg Forest Products, Roseburg, OR www.roseburg.com.
6. Trus Joist Corp, Div Weyerhaeuser, Boise, ID www.tjm.com or Surrey, BC (604) 588-7878.
7. Web Joist, Chehalis, WA www.webjoist.com.
8. Weyerhaeuser, Engineered Lumber Products, Boise, ID www.woodbywy.com.
9. Equal as approved by Architect before bidding. See Section 01 6200.

C. Design Criteria:
1. Materials shall be tested and evaluated in accordance with ASTM D5456.
2. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

D. Materials:
1. Wood framing list:
   a. Provide Category Three Approved Suppliers with wood framing list.
2. Members:
   a. Identify materials by stamp or stamps indicating manufacturer's name, product trade name, grade, species (if applicable), evaluation report number, plant number, and name or logo of independent inspection agency.
3. Adhesive: Meet requirements of ASTM D2559.

E. Fabrication: Materials shall be manufactured in a plant evaluated for fabrication by governing code evaluation service and under supervision of third party inspection agency listed by governing code evaluation service.

PART 3 - EXECUTION: Not Used

END OF SECTION

DIVISION 07: THERMAL AND MOISTURE PROTECTION

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SECTION 07 3113

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install Asphalt Shingle Roofing System as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Miscellaneous flashing and sheet metal:
      a. Drip metal.
      b. Valley flashing.
      c. Wall flashings.
   2. Pipe and flue roof jacks.
   3. Ridge vent.

C. Related Requirements:
   1. Section 07 6310: ‘Steep Slope Roof Flashing: Asphalt Tile' for furnishing of roof flashing, pipe jacks, drip edge and miscellaneous flashing and sheet metal.
   2. Section 07 7226: 'Ridge Vent.

1.2 REFERENCES

A. Definitions:
   1. Flame Spread Classification: Categories as per ASTM E84/UL 723 or CAN/ULC-S102:
      a. Class A: Highest fire-resistance rating for roofing as per ASTM E108. Indicated roofing is able to withstand severe exposure to fire exposure to fire originating from sources outside building.
      b. Class B: Fire-resistance rating indicating roofing materials are able to withstand moderate exposure to fire originating from sources outside of building.
      c. Class C: Fire-resistance rating indicating roofing materials are able to withstand light exposure to fire originating from sources outside of building.
   2. Wind Uplift: Wind-induced forces on roof system or components in roof system. Wind uplift generally includes negative pressure component caused by wind being deflected around and across surfaces of building and positive pressure component from air flow beneath roof deck.

B. Reference Standards:
   1. ASTM International:
      a. ASTM D226-09/D226M-17, ‘Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing'.
      b. ASTM D1970/D1970M-18, ‘Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection'.
      c. ASTM D3018/D3018M-11(2017), ‘Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules'.
      d. ASTM D3019/D3019M-17, ‘Standard, ‘Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered’.
      e. ASTM D3161/D3161M-16a, ‘Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)'.
      f. ASTM D3462/D3462M-16, ‘Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules'.
      g. ASTM D4869/D4869M-16a, ‘Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing'.

h. ASTM D7158/D7158M-17, ‘Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)'.
i. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.
j. ASTM E108-17, ‘Standard Test Methods for Fire Tests of Roof Coverings’.
k. ASTM F1667-18, ‘Standard Specification for Driven Fasteners: Nails, Spikes, and Staples’.

2. Canadian Standards Association (CSA Group):
   a. CSA A123.5-16, 'Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules / Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules'.
3. International Building Code (IBC) (2018 Edition or latest edition adopted by AHJ):
   a. Chapter 15, 'Roof Assemblies And Rooftop Structures'.
4. National Fire Protection Association:
   a. NFPA 101: ‘Life Safety Code’ (2015 Edition).
5. Underwriters Laboratories (UL):
   a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
   b. UL 723, ‘Tests for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
   c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
   d. UL 2218, 'Standard for Impact Resistance of Prepared Roof Covering Materials' (2nd Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference:
   a. Roofing Installer’s Foreman and those responsible for installation of roofing to be in attendance. Include Shingle Manufacturer’s Representative if available.
2. Schedule pre-installation conference at project site after completion of the installation of roof sheathing but before installation of any roofing system component.
3. In addition to agenda items specified in Section 01 3100, review following:
   a. Review if Project is in high wind area.
   b. Review if Project could have ice dam problems.
   c. Review Shingle Manufacturer’s ventilation requirements.
   d. Review Shingle Manufacturer’s Ambient Conditions requirements.
   e. Review existing roof conditions including moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
   f. Review proper valley, flashing, penetrations, secondary underlayment, sealants, and nailing requirements.
   g. Review racking installation method is not permitted.
   h. Review steeple base secondary underlayment installation under Steeple.
   i. Review Cleaning and Disposal requirements.
   j. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
   k. Review safety issues.

B. Sequencing:
1. Sequence of Roofing Materials (see valley flashing detail in Contract Drawings):
   a. Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes of secondary underlayment.
   b. Metal drip edge.
   c. Secondary underlayment.
   d. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley.
   e. Install one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
   f. Install formed valley metal over strip of primary underlayment.
   g. Apply 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).
   h. Primary underlayment.

i. Asphalt shingles.
2. Coordinate sequencing of products furnished in Section 07 7226: 'Ridge Vents'.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Color and style selection.
2. Samples:
a. Full size shingle.

B. Informational Submittals:
1. Certificates:
a. Installers:
1) Provide current Certification for completion of certified training from Shingle Manufacturer.
2) Installer's signed certificate stating roofing system complies with Contract Documents performance requirements and work only performed by trained and authorized personnel in those procedures.
2. Tests And Evaluation Reports:
3. Reports:
a. Manufacturer's test reports.
b. Wind speed coverage for warranted wind speed.
c. High wind reports and approvals if required by AHJ.
4. Manufacturers' Instructions:
a. Shingle Manufacturer's installation instructions and details for installation of secondary underlayment at penetrations, dormers, eaves, rakes, etc, to fit environmental conditions at Project.
5. Special Procedure Submittals:
a. Contact Owner's Representative (FM Group or Project Manager) for following information:
1) Installer to include following mandatory information to be added to 'Roofing Manufacturer System Warranty' submitted with Closing Documents.
a) Name of Owner (name of FM Group) _____
b) Mailing Address (FM office address) _____
c) Building Property ID (unique 7 digit identifier) _____
d) Project site address: _____
e) Roof Completion Date _____
f) Any addition data required from Manufacturer.
2) Installer to include following mandatory information to be added to 'Roof Installer Workmanship Warranty' submitted with Closing Documents:
a) Name of Owner (name of FM Group) _____
b) Mailing Address (FM office address) _____
c) Building Property ID (unique 7 digit identifier) _____
d) Project site address: _____
e) Roof Completion Date _____
f) Any addition data required from Manufacturer.
6. Qualification Statement:
a. Installer:
1) Asphalt Shingles:
a) Provide Qualification documentation.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Asphalt Shingles:
a) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
b) Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.

2) Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.

b. Record Documentation:
1) Manufacturers Documentation:
a) Manufacturer's literature.
b) Color selections.
c) Test and evaluation reports.
2) Roofing Inspection Documentation:
a) Include copy of roof inspection report.
3) Certificate: Installer statement of compliance for performance requirements.
4) Certificate: Installer completion of certified training.
5) Test And Evaluation Report: UL fire-resistance rating test report.
6) Test And Evaluation Report: NFPA 101 Class A approval.
7) Test And Evaluation Report: Wind resistance requirements required.

D. Maintenance Material Submittals:
1. Extra Stock Materials:
a. Provide one (1) square minimum of bundled shingles.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Building Codes:
a. Meet requirements for NFPA 101 Class A roof assembly.
b. Roof system will meet requirements of all federal, state, and local codes having jurisdiction.
2. Fall Protection: Meet requirement of fall protection as required by federal, state, and local codes having jurisdiction.
3. Fire Characteristics:
a. Provide shingles and related roofing materials with fire-test-response characteristics indicated, 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 materials with appropriate markings of applicable testing and inspecting agency:
1) Exterior Fire-Test Exposure: Class A; UL 790, CAN/ULC-S102, or ASTM E108, for application and roof slopes indicated.
a) Materials shall be identified with appropriate markings of applicable testing agency.
4. Impact Resistance:
a. Meet UL 2218 impact resistant testing.
b. Meet UL 2218 Class 4 impact resistant rating for hail.
5. Wind Resistance:
a. Meet ASTM D3161/D3161M for wind resistance.
1) Installation shall comply with IBC Table 1507.2.7, 'Attachment'.
6. Wind Speed:
a. As required to meet local codes having jurisdiction.
7. Wind Uplift Resistance:
a. Meet UL 580 wind uplift of roof assemblies.
b. Meet UL 1897 uplift test for roof covering systems.
c. Meet ASTM D7158/D7158M for wind resistance for uplift force/uplift resistance.

B. Qualifications:
1. Manufacturer:
a. Asphalt Shingles:
1) Asphalt shingles are required to be produced under quality control program administered by inspection agency currently accredited by ICBO ES or recognized by National Evaluation Service, Inc. Quality control manual developed in consultation with approved agency, and complying with ICBO ES Acceptance Criteria for Quality Control Manuals (AC10), must be submitted.
b. Underlayment:

1) Underlayment is required to be manufactured under approved quality control program with inspections by inspection agency accredited by International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.
2) Quality documentation complying with ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for roof underlayment.

2. Roof Installer Foreman Qualifications:
   a. Requirements of Section 01 4301 applies but not limited to the following:
      1) Provide documentation if requested by Architect.
         a) Approved and authorized by Roofing Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's warranty before bid.
         b) Completed Shingle Manufacturer's certified trained.
         c) Have thorough knowledge of installing asphalt shingle roofing and have minimum of five (5) years roofing experience.
         d) **Current license for the city, county, and state where project is located and license for specific type of roofing work to be performed.**
         e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
         f) Flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.
3. Roof Installer:
   a. Provide 'Roof Installer Workmanship Warranty' as specified in Warranty in Part 1 of this specification.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Make no deliveries to job site until installation is about to commence, or until approved storage area is provided.
   2. Deliver products job site in Manufacturer's original unopened containers or wrappings with labels intact and legible bearing all seals and approvals.
   3. Deliver materials in sufficient quantities to allow continuity of work.
   4. Remove any material not approved from job site.

B. Storage And Handling Requirements:
   1. Storage Requirements:
      a. Follow Manufacturer's instructions and precautions for storage and protection of materials.
      b. Protect roof materials from physical damage, moisture, soiling, and other sources in a clean, dry, protected location.
      c. Stacking:
         1) Shingles: Bundles should be stacked flat.
         2) Underlayment:
            a) Do not double-stack pallets.
            b) Stack rolls upright until installation.
      d. Temperature:
         1) Shingles:
            a) Store in covered ventilated area at maximum temperature of 110 deg F (43 deg C).
            b) Use extra care in handling shingles when temperature is below 40 deg F (4.4 deg C).
         2) Underlayment: Store in area with temperature between 40 deg F and 100 deg F (4.4 deg C and 38 deg C).
      e. Unacceptable Material:
         1) Remove from job site materials that are determined to be damaged by Architect or by Roofing Manufacturer and replace at no additional cost to Owner.
   2. Handling Requirements:
      a. Handle rolled goods to prevent damage to edge or ends.
   3. Roof Top Loading:
      a. Lay shingle bundles flat.
      b. Do not bend over ridge.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. General:
   a. Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
2. Shingles:
   a. Do not install shingles at lower temperatures than allowed by Shingle Manufacturer for application.
3. Underlayment:
   a. Install self-adhering sheet underlayment within range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Special Warranty:
1. Shingle Manufacturer's special forty (40) year minimum labor and material warranty written for The Church of Jesus Christ of Latter-day Saints program, including but not limited to:
   a. CertainTeed:
      1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
   b. GAF:
      1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
   c. Owens Corning:
      1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
2. Standard Wind Areas:
   a. Roofing system will resist blow-offs in winds up to 110 mph (177 kph) for ten (10) years when installed as specified below.
   b. Meet requirements of ASTM D3161/D3161M UL Class D.
3. Roof Installer Workmanship Warranty:
   a. Provide ten (10) year workmanship warranty on roofing system and related components, including flashings, and responsible for all repairs to roofing system and related components due to roof installer’s own negligence or faulty workmanship:
      1) In the event that, during ten (10) year period following installation, Roof Installer defaults or fails to fulfill its obligation in relation to workmanship warranty as specified in Manufacturer’s Agreement, Manufacturer will assume that obligation for remainder of ten (10) year period following original installation and Owner shall have no obligation to make or pay for repairs to or materials for roofing system that are necessary due to Roof Installer’s negligence or faulty installation during that period.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
   a. CertainTeed Roofing Products, Valley Forge, PA www.certainteed.com.
      1) Contact Information: Wendy Fox, (800) 404-9880 wfox@dataworksintl.com.
   b. GAF Materials Corp., Wayne, NJ www.gaf.com.
      1) Contact Information: John Arellano (office) (210) 896-1041 (fax) (210) 259-8050.

c. Owens Corning, Toledo, OH www.ownscorning.com.
1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution. Any distribution questions, contact Area Sales Manager.
2) For all other questions, Contact: Sam Baroudi (419) 248-7754 sam.baroudi@owenscorning.com. or Robert Hill (801) 553-2417 Robert.Hill@owenscorning.com.

B. Components:
1. Shingles And Underlayment:
a. Fiberglass mat shingles meeting or exceeding requirements of:
1) UL Class A Fire Resistance.
2) ASTM D3018/D3018M, Type I (self sealing).
3) Standard Wind Areas: ASTM D3161/D3161M UL Class D.
4) ASTM E108 Class A.
5) CSA A123.1/A123.5 (Canada).
6) ASTM D3462/D3462M where required by local codes.
7) Secondary Underlayment: Meet requirements of ASTM D1970/D1970M and UL 790 Class A Fire Resistance.
8) Primary (Synthetic) Underlayment: Meet requirements of ASTM D226/D226M and ASTM D4869/D4869M (physical properties only) or ASTM D1970/D1970M and ASTM E108 Class A Fire.
9) Color as selected by Architect from Shingle Manufacturer's full color line.
b. Category Three Approved Manufactures and Products. See Section 01 6200 for definitions of Categories:
1) CertainTeed:
a) Shingles:
(1) Standard Wind: Landmark Premium.
(2) Hip And Ridge Shingles: Shadow Ridge or Laminate Accessory for shingle used.
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Diamond Deck.
c) Secondary Underlayment Under Shingles:
(1) WinterGuard High Tack/High Temperature.
d) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
2) GAF:
a) Shingles:
(1) Standard Wind: Timberline Ultra HD.
(2) Hip And Ridge Shingles: TimberTex or Ridglass.
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Tiger Paw.
c) Secondary Underlayment Under Shingles:
(1) StormGuard.
d) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
3) Owens Corning:
a) Note:
(1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution.
(2) Any questions, contact Manufactures Area Sales Manager.
b) Shingles:
(1) Standard Wind: Duration Premium shingles.
(2) Hip And Ridge Shingles: DecoRidge Hip & Ridge.
c) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Deck Defense High Performance Roof Underlayment.

d) Secondary Underlayment Under Shingles:
(1) Weatherlock Specialty Tile & Metal for High Temperature.
e) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

2.2 ACCESSORIES

A. Elastomeric Roofing Sealant:
1. Design Criteria:
a. Meet requirements of ASTM D3019/D3019M.
b. Non-asphalt roofing cement (not permitted).
c. Elastomeric.
d. Cold temperature pliability.
e. Compatible with roof penetration boots.
2. Category Four Products And Manufacturers. See Section 01 6200 for definitions of Categories:
a. Flintbond SBS Modified Bitumen Caulk by CertainTeed.

B. Fasteners:
1. Primary Underlayment:
a. Corrosion resistant roofing nails with one inch (25 mm) diameter head and 3/4 inch (19 mm) long shank minimum.
1) If shingles applied as underlayment is laid, use metal or plastic head Simplex roofing nails.
2) If shingles not applied as underlayment is laid, use plastic head only.
b. Staples not permitted.
2. Shingles:
a. Design Criteria:
1) Meet following requirements for nails:
a) Comply with ASTM F1667, Type I, Style 20-Roofing Nails.
b) Eleven gauge galvanized steel or equivalent corrosion-resistant roofing nail.
c) Nail head sizes: 3/8 inch (9.5 mm) nominal diameter.
d) Sufficient length to penetrate through roof sheathing 1/4 inch (6 mm) or 3/4 inch (19 mm) minimum into solid wood decking.
e) Hot-dipped galvanized or electroplated fasteners comply with requirements of ASTM A153, Class D.
f) Stainless-steel fasteners meet requirements of Type 304 (UNS S30400) or Type 316 (UNS S31600).
b. General:
1) Hot-dipped galvanized, electroplated non-corrosive gun-driver nails, or stainless-steel fasteners may be used.
2) Fasteners within 15 miles (24.1 km) of coastal areas (oceanside) applications must use hot-dipped galvanized or stainless steel.
3) All exposed fasteners (including ridge shingles) must use hot-dipped galvanized or stainless steel.
4) Staples not permitted:
a) Architect/Roof Consultant may approve in writing, staple gun that installs exposed fasteners with staples.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Category Three Approved Manufacture's Roofing Installers: See Section 01 4301.
1. Utah Area:
a. Approved Installers:

1) CertainTeed:
   a) AMCO American Roofing Co., Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276.
   b) Heritage Roofing, Bluffdale, UT – Contact: James Smith (801) 576-8447.
   c) JTS Roofing Inc., Ogden, UT – Contact: Todd Shupe (801) 627-6450.
   d) North Face Roofing, Inc., Park City, UT – Craig Peters (801) 455-8492.
   e) Perkes Roofing, Ogden, UT – Contact: Mark Perkes (801) 731-6918.
   f) Redd Roofing Co., Ogden, UT – Lance Redd (801) 621-1363.
   g) VIP Roofing, Centerville, UT – Contact: Max Ker (801) 631-6182.
2) GAF:
   a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith Yorgason (801 269-1276.
   b) Aspen Roofing, Salt Lake City, UT – Contact: Jon Brady (801) 483-1660.
   c) Capital Roofing Service, Inc., Sandy, UT – Contact: Paul Hitzman (801) 562-5568.
   d) Fortress Roofing, Murray, UT – Contact: Adam Cordon (801) 509-8625.
3) Owens-Corning:
   a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276

3.2 EXAMINATION

A. Verification Of Conditions:
   1. Examine deck to determine if it is satisfactory for installation of roofing system. Conditions include, but are not limited to, moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
      a. Report unsatisfactory conditions in writing to Architect.
      b. Commencement of Work by installer is considered acceptance of substrate.
   2. Verify existing soffit and ridge vents meet ventilation code requirements.
      a. Report inadequate ventilation conditions with recommendations in writing to Architect.

3.3 PREPARATION

A. Protection Of In-Place Conditions:
   1. Install only as much roofing as can be made weathertight each day, including flashing and detail work.

B. Surface Preparation:
   1. Clean roof deck:
      a. Remove dirt, protruding nails, shingle nails, and debris, before installation of underlayment.
   2. Roof deck must be dry to help prevent buckling of deck, which can result in deck movement and damage to primary underlayment.
   3. Following Manufacturer’s recommendations for placing materials on roof.
      a. Prevent material from sliding off roof.

3.4 INSTALLATION

A. General:
   1. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.

B. Sequence of Roofing Materials as shown and noted on Contract Drawings:
   1. 12 inch strip Secondary Underlayment at Eave.
   2. Metal Drip Edge.
   3. General Secondary Underlayment.
   4. Valley Secondary Underlayment (8' - 6" (2.62 m) wide strip of Secondary Underlayment (3 strips) in Valleys applied over sheathing).

5. Valley Secondary Underlayment (36 inch (915 mm) wide Primary Underlayment under Valley Metal).
6. Valley Metal (24 inch (610 mm) wide valley metal 10 ft (3.05 m) lengths).
7. 12 inch strip of Secondary Underlayment over nailed edges (of Valley Metal).
8. General Primary Underlayment.
9. Asphalt Shingles, Step Flashings.
10. Counter Flashing.

C. Underlayment:
1. General:
   a. Temporary Roof:
      1) Do not use permanent underlayment installation as temporary roof.
      2) If temporary roof is used, remove completely before installation of permanent underlayment.
   b. Follow Shingle Manufacturer's recommendations for installation of primary and secondary underlayment, particularly at eaves, rakes, and penetrations, unless specified installation procedures and Contract Drawing details are more stringent.
   c. Avoid scuffing underlayment that can compromise surface and cause leaking. If scuffing occurs, following Manufacturer's recommendation for repair.
   d. Staples are not permitted.
   e. Weather conditions:
      1) Do not leave underlayment exposed to weather more than thirty (30) days after beginning of underlayment installation even if Manufacture allows longer period of time.
      2) If underlayment is exposed for more than thirty (30) days after beginning of underlayment installation, treat as temporary roof under first paragraph above.
      3) If moisture is deposited on exposed underlayment, obtain written approval from Shingle Manufacturer's Representative before installing shingles.
   f. Install valley secondary underlayment, valley primary underlayment, and valley metal after installation of general secondary underlayment, but before installation of general primary underlayment.
2. Primary Underlayment:
   a. Apply 48 inch (1 200 mm) wide courses over complete deck, including areas covered with secondary underlayment unless specified otherwise.
      1) Overlap underlayment before fastening.
      2) Maintain end laps of 6 inch (150 mm) and side laps of 3 inch (76 mm).
      3) Stop primary underlayment between 3 and 6 inches (75 and 150 mm) of inside edge of strip of secondary underlayment installed over edge of formed valley metal.
   b. Nailing Synthetic Underlayment:
      1) Use low-profile plastic or steel cap corrosion resistant nails with 1 inch (25 mm) diameter heads to fasten underlayment in place. (Fastening underlayment without caps is not permitted).
      2) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
      3) Fasteners should be long enough to penetrate at least 3/4 inch (19 mm) into roof sheathing. Fasteners must be lie flush to roof deck at 90 degree angle to roof deck and tight with underlayment.
      4) Do not nail through metal flashing, except drip edge, when installing primary underlayment.
      5) Follow Shingle Manufacturer's installation instructions for following:
         a) Securing underlayment to roof deck adjusting for roof slope nailing requirements.
         b) Side lap, end lap, and overlapping nailing requirements.
         c) Rake and eave nailing requirements.
         d) High wind condition nailing requirements.
         e) Sealants recommendations.
3. Secondary Underlayment:
   a. Under Shingles:
      1) Lap end joints 6 inches (150 mm) and side joints 3 inch (76 mm) minimum.
      2) Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes before installing drip edge.

3) Apply two (2) 36 inch (900 mm) wide courses along eaves and rakes as described in Contract Documents with first course overlapping drip edge and 12 inches (300 mm) wide previously applied strip.

4. Valley Underlayment:
   a. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley lapped to provide 102 inch (2 590 mm) wide covered area centered over valley.
   b. Apply one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
   c. Install formed valley metal over strip of primary underlayment.
      1) Nail top of each section and lap 8 inches (200 mm) in direction of flow.
      2) Seal laps with continuous bead of elastomeric roofing sealant.
      3) Secure edges of valley metal with fasteners spaced at 12 inches (300 mm) maximum on center and approximately 1/2 inch (13 mm) in from edge of metal.
   d. Install 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).

D. Shingles:
1. Before installing shingles, inspect underlayment and metal installation with Architect and Owner. Correct improperly installed and damaged material before beginning shingle installation.
2. Racking installation method is not permitted by Owner and will be considered non-conforming work.
3. Starter shingles:
   a. Manufacturer’s starter shingles are required for Shingle Warranty.
   b. Install shingles at eve and rakes in accordance with Shingle Manufacturer’s instructions.
   c. Cut shingles in accordance with Shingle Manufacturer's instructions, or use approved starter course.
   d. Nail to eave granule side up in continuous mastic bed with cut edge down-slope and edge overhanging eave 3/8 inch (9 mm) so sealing tabs are at edge of eave.
   e. Install shingles with maximum exposure recommended by Shingle Manufacturer.
   f. Lay first course directly over starter strip with ends flush with starter strip at eaves and so joints in starter strip are offset 4 inches (100 mm) minimum from joints in first course.
4. Lay shingles so end joints are offset in accordance with Shingle Manufacturer's installation procedures.
5. Insure alignment by snapping chalk line at least each fifth course to control horizontal and vertical alignment.
6. Run courses true to line with end joints properly placed. Leave shingles flat without wave and properly placed.
7. Hip and ridge shingles:
   a. Manufacturer’s hip and ridge shingles are required for Shingle Warranty.
   b. Install specified hip and ridge shingles in accordance with Shingle Manufacturer's instructions.
   c. Run ridge shingles as directed by Architect.
8. Nailing:
   a. General:
      1) Six (6) Nail Pattern as recommended by Shingle Manufacturer for Shingle Warranty in each shingle.
      2) Place in relation to top edge of shingle as required by Shingle Manufacturer.
      3) Place nails one inch (25 mm) from each end of shingle and remainder evenly spaced between.
      4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
   b. Nailing guns:
      1) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
      2) Adjust nail gun pressure for nailing flush and tight to deck without cutting shingle surface.
      3) Drive nails perpendicular to shingle surface so nail head is flat against shingle.
      4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
9. Hand-Sealing:

a. If ambient temperature or exposure to sun will not be sufficient to secure adhesive strip to under-lying shingle within one week, hand seal shingles with elastomeric roofing sealant.

10. Over valley metal:
    a. Do not drive nails through valley metal.
    b. Run chalk line so valley metal will be exposed 6 inches (150 mm) wide at top and diverge 3/32 inch (one mm) per ft (300 mm) down to eaves.
    c. Neatly trim shingles to this line.
    d. Seal trimmed shingle edges to valley metal with continuous bead of elastomeric roofing sealant applied within one inch (25 mm) of shingle edge.
11. Vent pipe sleeve flange:
    a. Vent pipe sleeve flange as specified in Section 07 6310.
    b. Fit shingles under lower edge and over sides and upper edge.
    c. Set vent pipe flange in elastomeric roofing sealant.
    d. Embed shingles in elastomeric roofing sealant where they overlap flange.
    e. Apply bead of elastomeric roofing sealant at junction of vent pipe and vent flashing.
12. Furnished and installed in Section 07 7226 'Ridge Vents'.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.
2. Raking installation method is not permitted by Owner and will be considered to be not complying with Contract Document requirements and must be corrected at no additional cost to Owner.

3.6 CLEANING

A. General:
1. All tools and unused materials must be collected at end of each workday and stored properly off finished roof surface and protected from exposure to elements.
2. Leave metals clean and free of defects, stains, and damaged finish.
    a. Replace fascia metal that is scratched through finish to base metal.
3. Properly clean finished roof surface after completion.
4. Verify drains and gutters are not clogged.
5. Clean shingles and building of soiling caused by this installation.
6. Clean and restore all damaged surfaces to their original condition.

B. Waste Management:
1. Disposal:
    a. All work areas are to be kept clean, clear and free of debris always.
    b. Do not allow trash, waste, or debris to collect on roof. These items shall be removed from roof daily.
    c. Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

3.7 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 6210

GALVANIZED STEEL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install miscellaneous flashing, counterflashing, and hold-down clips as described in Contract Documents and not specified to be of other material.

B. Products Furnished But Not Installed Under This Section:
   1. Miscellaneous sheet metal specialties not specified to be of other materials.

C. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for wood base.
   2. Sections under 07 3000 heading: 'Steep Slope Roofing' for installation of miscellaneous roofing related flashing.
   3. Sections under 07 5000 heading: 'Membrane Roofing' for installation of miscellaneous roofing related flashing.
   4. Section 07 9213: 'Elastomeric Joint Sealant'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:

a. ASTM A653/A653M-15, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
b. ASTM A792/A792M-10(2015), ‘Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.

   2. Federal Specifications:

a. TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Type Two Acceptable Manufacturers Of Metal:

a. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
b. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
c. Fabral, Lancaster, PA www.fabral.com.
d. Firestone Metal Producdts, Anoka, MN www.unaclad.com.
e. MBCI, Houston, TX www.mbci.com.
f. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
g. O’Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
i. Ryerson, Chicago, IL www.ryerson.com.
j. Equal as approved by Architect before installation. See Section 01 6200.

B. Materials:

1. Sheet Metal:

a. Galvanized iron or steel meeting requirements of ASTM A653/A653M, G 90 or Galvalume steel meeting requirements of ASTM A792/A792M AZ50, 50 ksi.
   1) 22 ga (0.792 mm) for hold-down clips.
   2) 24 ga (0.635 mm) for all other.

C. Fabrication:
1. Form accurately to details.
2. Profiles, bends, and intersections shall be even and true to line.
3. Fold exposed edges 1/2 inch (12.7 mm) to provide stiffness.

D. Finish:
1. Exposed to view:

a. Provide face coating of polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
b. Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Sealants: Rubber base type conforming to Fed Spec TT-S-00230C.

B. Fasteners:
1. Of strength and type consistent with function.
2. Nails: Hot-dipped galvanized.
3. Screws, Bolts, And Accessory Fasteners: Galvanized or other acceptable corrosion resistant treatment.

C. Roof Diverter:
1. Roof Diverter (Kickout Diverter) required when vertical wall extends beyond lower roof.

a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
b. Size: 6 inch (150 mm) x 6 inch (150 mm) by 12 inches (300 mm) length.

D. Step Flashing:
1. Step flashing required for steep slope for roof to wall flashing.

a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
b. Size: 5 inch (125 mm) x 5 inch (125 mm) by 8 inch (200 mm) or 12 inches (300 mm) length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install with small, watertight seams.

B. Slope to provide positive drainage.

C. Provide sufficient hold down clips to insure true alignment and security against wind.

D. Provide 4 inch (100 mm) minimum overlap.

E. Allow sufficient tolerance for expansion and contraction.

F. Insulate work to prevent electrolytic action.

G. Roof Diverter (Kickout Diverter):
1. Extend roof diverter 1 inch (25 mm) minimum beyond face edge of lower roof.
2. Extend underlayment vertically up wall behind flashing.
3. Solder all joints.
4. Apply sealant.

3.2 CLEANING

A. Leave metals clean and free of defects, stains, and damaged finish.

END OF SECTION

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SECTION 07 6310

STEEP SLOPE ROOF FLASHING: Asphalt Shingles

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Roof flashing including:
      a. Formed Valley Metal.
      b. Pipe flashing for vent piping and flues.
      c. Roof jacks.
      d. Saddles and curb flashings.
      e. Miscellaneous flashing.

B. Related Requirements:
   1. Section 07 3113: 'Asphalt Shingles' for installation.
   2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants.

1.2 REFERENCES

A. Definitions:
   1. Base Flashing: That portion of flashing attached to or resting on roof deck to direct flow of water onto the roof covering.
   2. Cap Flashing: Material used to cover top edge of base flashings or other flashings to prevent water seepage behind base flashing. Cap flashing overlaps base flashing.
   3. Collar: Pre-formed flange placed over vent pipe to seal roof around vent pipe opening. Also called vent sleeve.
   4. Drip Edge: Non-corrosive, non-staining material used along eaves and rakes to allow water run-off to drip clear of underlying building.
   5. Flange: Metal pan extending up and down roof slope around flashing pieces. Usually at plumbing vents.
   6. Flashing: Components used to prevent seepage of water into a building around any intersection or projection in a roof such as vent pipes, adjoining walls, and valleys.
   7. Metal Flashing: Roof components made from sheet metal that are used to terminate roofing membrane or other material alongside roof perimeters as well as at roof penetrations.
   8. Penetration: Any object that pierces surface of roof.
   9. Pipe Boot: Prefabricated flashing piece used to flash around circular pipe penetrations. Also known as a Roof Jack.
   10. Roof Jack: Term used to describe a Pipe Boot or Flashing Collar.
   11. Valley: Internal angle formed by intersection of two sloping roof planes to provide water runoff.
   12. Vent: Any outlet for air that protrudes through roof deck such as pipe or stack. Any device installed on roof, gable or soffit for purpose of ventilating underside of roof deck.
   13. Vent Sleeve: See collar.

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-15, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A792/A792M-10(2015), ‘Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
   2. ASTM International: (specifically referenced for pipe flashing only):
      a. ASTM B117-16, 'Standard Practice for Operating Salt Spray (Fog) Apparatus'.

b. ASTM E283-04(2012), 'Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen'.
c. ASTM E330/E330M-14, 'Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference'.
d. ASTM E331-00(2016), 'Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference'.
e. ASTM E2140-01(2017), 'Standard Practice for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head'.

1.3 SUBMITTALS

A. Informational Submittals:
1. Tests And Evaluation Reports:
a. Manufacturer's test reports:

1.4 WARRANTY

A. Pipe Flashing:
1. Manufacturer's warranty against defects in materials and workmanship when correctly installed in appropriate application for life of original roofing material from installation or replacement or fifty (50) years whichever is greater.

B. Pipe Flashing For Concentric Piping Flashing Retrofitting:
1. Manufacturer's twenty (20) warranty pipe flashing will not fail (does not allow water to leak through flashing) due to normal weather and atmospheric conditions from date of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
1. Type Two Acceptable Manufacturers:
a. Aztec Washer Co., Poway, CA www.aztecwasher.com.
b. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
c. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
d. Fabral, Lancaster, PA www.fabral.com.
e. Firestone Metal Products, Anoka, MN www.unaclad.com.
f. MBCI, Houston, TX www.mbci.com.
g. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
h. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
i. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
j. Ryerson, Chicago, IL www.ryerson.com.
k. Equal as approved by Architect before installation. See Section 01 6200.

B. Formed Valley Metal And Drip Edge:
1. Metal:
a. Steel: Minimum 24 ga (0.635 mm), hot-dipped galvanized to meet requirements of ASTM A653/A653M, 1.25 oz/sq ft. or galvalume meeting requirements of ASTM A792/A792M AZ50, 50 ksi.

C. Fabrication:
1. Valley-ribbed flashing:
a. Form accurately to details. Provide formed valley metal in 10 foot (3 meter) lengths with one inch (25 mm) 'V' crimp and break in center to match roof slopes.

2. Profiles, bends, and intersections shall be even and true to line.

D. Finishes:
1. Face coating polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
2. Reverse side coating of steel flashings to be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
3. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Pipe Flashing For Plumbing Vent Lines metal flues, and HVAC Air Piping:
1. Description:
   a. Ultra-pure high consistency molded one hundred (100) percent silicone rubber pipe boot that prevents cracking and splitting for life of roof.
2. Design Criteria:
   a. Meet following Tests:
      1) ASTM B117 (Salt Spray Test).
      2) ASTM E283 (Air Leakage).
      3) ASTM E 330 (Uniform Structural Load).
      4) ASTM E331 (Water Penetration).
      5) ASTM E2140 (Water).
   b. Material warranty of product for life of roof.
3. 24 ga (0.635 mm) coated galvanized steel plate.
4. Minimum 4 inch (100 mm) flashing on each side, 6 inch (150 mm) flashing at top, 3 inch (76 mm) flashing at bottom with nailing slots.
5. UV stable solid molded PVC compression collar.
6. Use Ultimate Pipe Flashing for PVC, ABS and IP.
7. Use Ultimate Pipe Flashing and Easy Sleeve for Copper, Cast Iron, or irregular and damaged pipes:
   a. Black PVC with integral cap.
8. Sizes: 1-1/4 inch (32 mm), 1-1/2 inch (38 mm), 2 inch (50 mm), 3 inch (76 mm), and 4 inch (100 mm).
9. Slope: Flat to 18/12 pitch.
10. Flashing Finish: Face coating polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
11. Color: Brown (no other color available).
12. Category Four Approved System Manufacturers. See Section 01 6200 for definitions of Categories:
    a. Ultimate Pipe Flashing by Lifetime Tool & Building Products LLC, Winchester, VA www.lifetimetool.com (877) 904-1002.
    b. Ultimate Pipe Flashing and Easy Sleeve by Lifetime Tool & Building Products LLC, Winchester, VA www.lifetimetool.com (877) 904-1002.

B. Roof Jacks For Metal Flues: Factory-made galvanized steel.

C. Pipe Flashing For Concentric Piping Flashing Retrofitting:
1. Description:
   a. Black EPDM Pipe flashing for existing Concentric Piping for reroofing existing roofs (cutting Concentric Roof Termination cap off and replacing is not permitted).
   b. Weather resistance to withstand ultra violet light and ozone.
   c. Malleable base to conform to different roof pitches.
   d. Pipe size: 1/2 inch (12.7 mm) to 4 inch (101 mm).
      1) On-site customization.
   e. Fasteners included.

2. Type One Acceptable Products:
   a. Aztec RF101BP.
   b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Coordinate with pipe installers for proper size of roof jacks and pipe flashing.

B. Pipe Flashing:
   1. Follow Manufacturer's installation instructions.

C. Pipe Flashing For Concentric Piping Flashing Retrofitting:
   1. Follow Manufacturer's installation instructions including but not limited to:
      a. Choose appropriate retrofit size.
      b. Wrap pipe flashing around pipe.
      c. Apply 100 percent silicone sealant between base, roof, and top of flashing.
      d. Use fasteners provided.
      e. Apply cable tie as directed.

END OF SECTION

SECTION 07 6322

STEEL FASCIA

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal fascia as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-15, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A792/A792M-10(2015), ‘Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
      c. ASTM E84-16, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet for products furnished.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire Characteristics Performance Requirement:
      a. Meet requirements of ASTM E84 Class A fire rating.

B. Qualifications:
   1. Installer:
      a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Materials shall be delivered in original, unopened packages with labels intact.
   2. Inspect delivered material for damage.

B. Storage And Handling Requirements:

1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty against manufacturer defects.
   2. Manufacturer's written thirty five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Type One Acceptable Manufacturers Of Metal:
      a. AEP / Span, Dallas, TX www.aep-span.com.
      b. ATAS Aluminum Products, Allentown, PA www.atas.com.
      c. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
      d. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
      e. Fabral, Lancaster, PA www.fabral.com.
      f. Firestone Metal Products, Anoka, MN www.unaclad.com.
      g. Hunter-Douglas Canada Ltd, Brampton, ON www.hunterdouglasgroup.com.
      h. Kaycan Ltd, Montreal, PQ (514) 334-7550 www.kaycan.com.
      i. MBCI, Houston, TX www.mbci.com.
      j. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
      k. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
      l. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com
      m. Ryerson, Chicago, IL www.ryerson.com.
      n. VicWest, Oakville, ON www.vicwest.ca
      o. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials: Minimum 24 ga (0.635 mm), hot-dipped galvanized to meet requirements of ASTM A653/A653M, 1.25 oz/sq ft or galvalume meeting requirements of ASTM A792/A792M AZ50, 50 ksi and complete with accessories recommended by Manufacturer for proper installation.

C. Fabrication: Fascia may either be shop-fabricated using metal from a specified manufacturer, or a factory-fabricated standard system from a specified manufacturer.

D. Finishes:
   1. Face coating polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) for coil coating components containing 70 percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
   2. Reverse side coating thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
   3. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Fastening Devices: Galvanized steel screws.

B. Continuous Soffit Vent:

1. Type Two Acceptable Products:
   a. Aluminum 8.8 sq in (56.8 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2 inches (50 mm). Color: white or brown.
      1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
   b. Aluminum 9.9 sq in (63.9 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2-1/4 inches (57 mm). Color: white or brown.
      1) Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
   c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate and verify framing is suitable for installation of fascia.
   2. Notify Architect of unsuitable conditions in writing.
      a. Do not install fascia over unsuitable conditions.
      b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Conceal fasteners except where details might require a minimum number to be exposed. Paint heads of exposed fasteners to match background.

B. Install with slip joints at each end. Screw to substrate through pre-drilled, over-size holes.

C. Isolate from dissimilar metals not part of fascia system to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

A. General:
   1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.

B. Waste Management:
   1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

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SECTION 07 7123

MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gutters and downspouts as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealant', for quality of sealants for joints.

1.2 REFERENCES

A. Reference Standard:
   1. Sheet Metal & Air Conditioning Contractors National Association Inc:
      a. SMACNA Architectural Sheet Metal Manual, (7th edition 2012).

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Show gutter cross-section, mounting method, gauge of metal, expansion joint design and locations, and downspout locations minimum.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Type Two Acceptable Manufacturers of Metal:
      a. ATAS Aluminum Products, Allentown, PA www.atas.com.
      b. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
      c. Fabral, Jackson, GA www.fabral.com.
      d. Firestone Metal Products, Anoka, MN www.unaclad.com.
      e. MBCI, Houston, TX www.mbci.com.
      f. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
      g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
      h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
      i. Reynolds Metals Company, Richmond, VA www.rmc.com.
      j. Ryerson, Chicago, IL www.ryerson.com.
      k. Equal as approved by Architect before installation. See Section 01 6200.

B. Materials
   1. Steel:
      a. Downspouts: Rectangular, 26 ga (0.0217 inches - 0.5512 mm) galvanized steel including necessary elbows.
      b. Gutters: 24 ga (0.0276 inches - 0.7010 mm) galvanized steel.
      c. Brackets: 22 ga (0.0336 inches - 0.8534 mm) galvanized steel or 26 ga (0.0217 inches - 0.478 mm) double-hemmed minimum.

d. Downspouts: Rectangular 0.032 inch (0.813 mm) minimum aluminum including necessary elbows.
e. Gutters: 0.04 inch (1.0 mm) minimum aluminum.
f. Brackets: 0.06 inch (1.52 mm) minimum aluminum.

2. Screws, Bolts, Nails, And Accessory Fasteners: Non-corrosive and of strength and type consistent with function.
3. Downspouts, gutters, brackets, fasteners, and accessories shall be compatible material.

C. Fabrication:
1. Fabricate in accordance with SMACNA Architectural Manual recommendations, where applicable.
2. Cross-sectional configuration of gutter shall be Style A, (Page 1.13 6th Edition) of SMACNA Architectural Manual.
3. Form accurately to details.
4. Profiles, bends, and intersections shall be even and true to line.

D. Finishes:
1. Metal exposed to view shall have face coating of polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF_2 in resin portion of formula.
a. Thermo-cured two (2) coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
b. Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
2. Color as selected by Architect from Manufacturer's standard colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection Of In-Place Conditions:
1. Before starting work, verify governing dimensions at building. Inspect for conditions that would prevent installation of specified system. Do not install over improper conditions.
2. Insulate work from fascia as necessary to prevent electrolytic action.

3.2 INSTALLATION

A. Allow no more than 40 feet (12 meters) between downspouts. Lap joints in downspouts 1-1/2 inches (38 mm) minimum in direction of water flow.

B. Furnish and install outlet tubes and gutter ends where required. Furnish and install expansion joints in runs exceeding 50 feet (15 meters) and in runs that are restrained at both ends. Lap other joints in gutter one inch (25 mm) minimum, apply sealant in lap, and stainless steel rivet one inch (25 mm) on center maximum.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
1. At completion of this work, block downspouts and flood gutters.
2. Notify Architect two (2) working days before testing.
3. Repair leaks and adjust for proper drainage.

3.4 CLEANING

A. Leave metals clean and free of defects, stains, and damaged finish.

END OF SECTION

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SECTION 07 7226

RIDGE VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish ridge vent system and installed under other Sections as described in Contract Documents.

B. Related Requirements:
   1. Section 07 3113: 'Asphalt Shingles' for ridge vent installed over Asphalt Shingle roofing.
   2. Section 07 9213: ‘Elastomeric Joint Sealants’.

1.2 REFERENCES

A. Definitions:
   1. Net Free Area (NFA): Total unobstructed area (adjusted for insect screen, louvers and weather coverings) through which air can pass through a vent; generally measured in square inches. All non-powered vents have a Net Free Area rating.

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-17, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A792/A792M-10(2015), ‘Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
      c. ASTM C920-18, ‘Standard Specification for Elastomeric Joint Sealants’.
   2. International Building Code (IBC) (2018 or latest adopted edition):
      a. Chapter 12, 'Interior Environment':
         1) Section 1203, 'Ventilation':
            a) 1203.2, ‘Attic Spaces’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference held jointly with Section 07 3113.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Review if Project is in high wind area.
      b. Review Ridge Vent Manufacturers ventilation cutout requirements on roof deck and location of ventilation cutouts shown on Contract Documents.

B. Sequencing:
   1. Coordinate installation with roof membrane.
   2. Installation of ridge vent system.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Instructions:
      a. Design details.

b. Published ridge vent installation instructions for R&I projects.
c. Storage and handling requirements.

B. Informational Submittals:
1. Certificates:
a. Manufacturer's Certificates of compliance showing products meet or exceed specified requirements.
2. Tests And Evaluation Reports:
a. Manufacturer's test reports.
b. Wind speed coverage for warranted wind speed.
3. Special Procedure Submittals:
a. Contact Owner’s Representative (FM Group or Project Manager) for following information:
1) Installer to include following mandatory information for Warranty Information to be given to Ridge Vent Manufacturer to be added to Manufacturer Warranty included with Closing Submittals:
a) Name of Owner (name of FM Group) _____
b) Mailing Address (FM office address) _____
c) Property ID _____
d) Site address: _____
e) Installation of Ridge Vent (or Roof Completion) Date _____
f) Any addition data required from Ridge Vent Manufacturer.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Final, executed copy of Warranty including Installer project information.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Ridge Vent System:
2. Wind Speed:
a. As required to meet local codes having jurisdiction.

B. Qualifications:
1. Manufacturer:
a. Company specializing in manufacturing products specified with this section with at least five (5) years experience and no known failures of specified product manufactured.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver products job site in original unopened containers or wrappings.
2. Deliver materials in sufficient quantities to allow continuity of work.

B. Storage And Handling Requirements:
1. Storage Requirements:
a. Follow Manufacturer’s instructions and precautions for storage of materials.
b. Protect materials from physical damage in a clean, dry, well vented, and protected location.
2. Handling Requirements:
a. Handle material so as to prevent damage.

1.7 WARRANTY

A. Manufacturer Warranty:
1. General:

a. Ridge vent system will provide calculated net free area (NFA) stated design.
b. Warranty starts at completion of installation.
c. Warranty covers replacement cost excluding labor and any costs involved with repairing or replacing other roofing or building materials.

2. Manufacturer's thirty (30) year warranty covering:
   a. Kynar 500 paint and finish warranty covering color fade, chalk, and film integrity for ridge vent system.
3. Manufacturer's twenty (20) year warranty covering:
   a. Ridge vent system to be free from defects that will affect its performance.
   b. Ridge vent system will withstand winds up to 120 mph (193 kph) average wind speed.
   c. Ridge vent system will withstand snow load.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Three Manufacturers And Products. See Section 01 6200 for definitions of Categories:
      a. Metal-Era Airflow Solutions, Waukesha, WI www.metalera.com.
         1) Contact Information: Alissa Kuether-Bonlender (800) 558-2162 thechurch@metalera.com.
      b. Western Metal Products, LC, Woods Cross, UT www.westernmetalproducts.com.
         1) Contact Information: James Rohletter, phone (888) 298-3454, email rvbid@westernmetalproducts.com.

B. Materials:
   1. Description / Design Criteria:
      a. Ridge Vent:
         1) Basis of Design:
            a) Basis of Design Approved Product:
               (1) LDS HI-PERF High Velocity Ridge Vent by Metal-Era.
            b) Basis of Design Approved Equivalent Product:
               (1) Ridge Vent by Western Metal.
         2) Design Criteria:
            a) Not approved on roof mean heights greater than 33 feet (10 m).
            b) Weather-proof and bug-proof ventilation system.
            c) Withstand winds up to 120 mph (193 kph) average wind speed.
            d) Provide net free area (NFA) requirements as determined by vented roof deck system and eave condition as indicated on Contract Drawings.
         3) Slope to Slope Version:
            a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
               (1) Model HPSS by Metal-Era.
               (2) Model: ASRP2 by Western Metal.
         4) Net free area (NFA): 20 sq. in.
   2. Components:
      a. Category Four Approved Product:
         1) Basis of design for System Components for this Project is Metal-Era Ridge Vent.
         2) Basis of design approved equivalent system components for this Project is Western Metal.
      b. Ridge vent system comprising of following:
         1) Cover plate 8 inch (200 mm) wide at each joint over ridge vent cover.
         2) Continuous deflector with baffle.
         3) Continuous Z bracket with intermittent spacer at 12 inch (305 mm) on center to supporting ridge cover.
         4) End cap / cover plate.
         5) Expanded metal support screen.
         6) Fasteners.

7) Intermittent spacers at 12 inch (305 mm) on center directly under ridge vent cover.
8) Ridge vent cover in 12 feet (3.657 m) length.

c. Metal:
1) 24 ga (0.0276 in) (0.7010 mm) minimum hot-dipped galvanized to meet requirements of ASTM A653/A653M, 1.25 oz per sq ft (381.5 g per sq m) or galvalume meeting requirements of ASTM A792/A792M AZ50.
2) Aluminum: 0.040 inch, 0.050, 0.063 inch.

d. Expanded metal support screen:
1) 0.050 inch (1.27 mm) 3003-H14 formed aluminum with minimum of 48 percent open area.

e. Z brackets: 20 gauge (0.0396 in) (1.0058 mm) G90 galvanized steel.
f. Deflector: 24 ga (0.0276 in) (0.7010 mm) minimum.

C. Finishes:
1. Ridge vent and accessories:
a. Polyvinylidene Fluoride (PV_2) Resin-base finish (Kynar 500) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
b. Approved Color: Medium Bronze.

2.2 ACCESSORIES

A. Ridge Vent System:
1. End Caps, Cover Plates, and other accessories necessary for proper installation.

B. Fasteners:
1. Ridge vent fastened to structure:
a. Category Four Approved Fasteners:
1) Basis of design: Metal-Era Ridge Vent.
2) Basis of design approved equivalent: Western Metal.
b. Fasteners shall be approved by Ridge Vent Manufacturer and provide minimum pull out resistance of 240 lbf (109 kg) into substrate when tested in accordance with TAS 105 test protocol:
1) Screws:
a) #9 1-1/2 inches (38 mm) stainless steel screws.
b) Provided by Manufacturer.
2) Existing Building:
a) #9 1-1/2 inches (38 mm) stainless steel screws.
b) Provided by Manufacturer.
or
c) Fasteners provided by Installer consistent with manufacturer's instructions for each product that is suitable for substrate to which it is being installed.
c. No nailing permitted.

C. Sealant:
1. Description:
a. Weathersealing expansion, contraction, perimeter, and other movement joint sealant.
2. Design Criteria:
a. As specified in Section 07 9213 'Elastomeric Joint Sealants'.
b. Meet following standards for Sealant:
1) ASTM C920: Type S Grade NS, Class 25 (min) Use O.
2) 100 percent silicone.
3. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a. Dow Corning: 790 Silicone Building Sealant.
b. Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
c. Tremco: Tremsil 600 Silicone Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Verify Ridge Vent Manufacturers ventilation cutout requirements on roof deck and location of ventilation cutouts shown on Contract Documents to verify correct location for all cutouts.
      a. Make adjustments to ventilation cutouts if necessary before installation of ridge vent.
   2. Examine deck to determine if it is satisfactory for installation of ridge vent system.
      a. Conditions include, but are not limited to, moisture on deck and protruding deck fasteners.
      b. Verify substrate is dry, clean and free of foreign matter.
   3. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

A. Surface Preparation:
   1. Clean roof sheathing, including removal of dirt, shingle nails, and debris, before installation of ridge vent system.

3.3 INSTALLATION

A. General:
   1. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.

B. Ridge Vent:
   1. Install in accordance with IBC Section 1503.2 'Flashing'.
   2. Install in accordance and as shown with Manufacturer's installation instructions for assembly of components and attachment to roof deck:
   3. Use provided fasteners consistent with manufacturer's instructions, suitable for substrate to which it is being installed.
   4. Attach to roof/wall structure with stainless steel screws provided by Manufacturer at spacing required by Manufacturer. All nail heads and vent section joints shall be sealed with silicone sealant.
   5. Remove protective film before applying sealant.
   6. Apply sealants as per Manufacturer's installation instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 CLEANING

A. General:
   1. Properly clean finished roof surface after completion.

B. Waste Management:
   1. Disposal:
      a. General:
         1) Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

END OF SECTION

SECTION 07 9213

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Removing existing sealants specified in Sections where work required.
   2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

A. Definitions:
   1. Sealant Types and Classifications:
      a. ASTM Specifications:
         1) Type:
            a) Type S: Single-component sealant.
            b) Type M: Multi-component sealant.
         2) Grade:
            a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
            b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
         3) Classes: Represent movement capability in percent of joint width.
            a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
            b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
            c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
            d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
         4) Use:
            a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
            b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
            c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
            d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
            e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
            f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.

g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

B. Reference Standards:
1. ASTM International:
a. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
c. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
e. ASTM D5893/D5893M-16, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
b. Manufacturer's literature for each Product.
c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
1. Certificates:
a. Manufacturer's Certificate:
1) Certify products are suitable for intended use and products meet or exceed specified requirements.
2) Certificate from Manufacturer indicating date of manufacture.
2. Manufacturers' Instructions:
a. Manufacturer's installation recommendations for each Product.
b. Manufacturer's installation for completing sealant intersections when different materials are joined.
c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
2. Applicator Qualifications:
a. Company specializing in performing work of this section.

b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:
1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:
1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer’s temperature recommendations for installing sealants.

1.8 WARRANTY

A. Manufacturer Warranty:
1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
a. Manufacturer's standard warranty covering sealant materials.
b. Applicator’s standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
a. Dow Corning Corp., Midland, MI www.dowcorning.com.
b. Franklin International, Inc. Columbus, OH www.titebond.com.
c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
d. Laticrete International Inc., Bethany, CT www.laticrete.com.
e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.

g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. Design Criteria:
a. Compliance: Meet or exceed requirements of these standards:
1) ASTM C920: Elastomeric joint sealant performance standard.
2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
b. Comply with Manufacturer's ambient condition requirements.
c. Sealants must meet Manufacturer's shelf-life requirements.
d. Sealants must adhere to and be compatible with specified substrates.
e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.
2. Sealants At Exterior Building Elements:
a. Description:
1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
a) Louvers.
b) Parapet caps.
c) Wall penetrations.
d) Other joints necessary to seal off building from outside air and moisture.
b. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
3) Color:
a) Architect to select from Manufacturer's standard colors.
b) Match building elements instead of window (do not use white that shows dirt easily).
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning:
a) Primer: 1200 Prime Coat.
b) Sealant: 791 Silicone Weatherproofing Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
a) Primer: SS4044 Primer.
b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
3) Tremco:
a) Primer:
(1) Metal surface: No. 20 primer.
(2) Porous surfaces: No. 23 primer.
b) Sealant: Spectrum 1 Silicone Sealant.
3. Sealants At Exterior Sheet Metal And Miscellaneous:

a. Description:
   1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
      a) Flashings.
      b) Gutters.
      c) Penetrations in soffits and fascias.
      d) Roof vents and flues.
      e) Lightning protection components.
b. Design Criteria:
   1) Meet following standards for Sealant:
      a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
   2) Limitations:
      a) Do not use below-grade applications.
      b) Do not use on surfaces that are continuously immersed or in contact with water.
      c) Do not use on wet, damp, frozen or contaminated surfaces.
      d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   1) Dow Corning: 790 Silicone Building Sealant.
   2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
   3) Tremco: Tremsil 600 Silicone Sealant.

2.2 ACCESSORIES

A. Bond Breaker Tape:
   1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
   2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.

B. Joint Backing:
   1. Comply with ASTM C1330.
   2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
   3. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner:
   1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape:
   1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate surfaces and joint openings are ready to receive Work.
      a. Verify each sealant is compatible for use with joint substrates.
      b. Verify joint surfaces are clean and dry.
      c. Ensure concrete surfaces are fully cured.
   2. Sealants provided shall meet Manufacturer's shelf-life requirements.
   3. Notify Architect of unsuitable conditions in writing.
      a. Do not proceed until unsatisfactory conditions are corrected.

4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
   1. Remove existing joint sealant materials where specified.
      a. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface using manufacturer's recommended joint preparation methods.
      b. Repair deteriorated or damaged substrates as recommended by Sealant Manufacturer to provide suitable substrate. Allow patching materials to cure.
   2. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
      a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
      b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
      c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
      d. Primers:
         1) Primers enhance adhesion ability.
         2) Use of primers is not a substitution for poor joint preparation.
         3) Primers should be used always in horizontal application where there is ponding water.
   3. Field test joints in inconspicuous location.
      a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
      b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
   4. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:
   1. Prepare joints in accordance with ASTM C1193.
      a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
      b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
      c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:
   1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:
   1. Apply silicone sealant in accordance with Manufacturer's instructions.
   2. Do not use damaged or deteriorated materials.
   3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
   4. Apply primer where required for sealant adhesion.
   5. Install sealants immediately after joint preparation.
   6. Do not use silicone sealant as per the following:
      a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
      b. Below-grade applications.
      c. Brass and copper surfaces.
      d. Materials bleeding oils, plasticizers, and solvents.
      e. Structural glazing and adhesive.
      f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:
   1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
   2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
   3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:
   1. Install bond breaker where joint backing is not used or where backing is not feasible.
      a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:
   1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
   2. Fill joint opening to full and proper configuration.
   3. Apply in continuous operation.
   4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
   5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.4 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer’s printed instructions.

3.5 FIELD QUALITY CONTROL

A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
   1. Perform adhesion tests in accordance with Manufacturer’s instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
      a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
      b. For sealants applied between dissimilar materials, test both sides of joints.
   2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
   3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

A. Remove masking tape and excess sealant.

B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

C. Waste Management: Dispose of products in accordance with manufacturer’s recommendation.

END OF SECTION

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DIVISION 08: OPENINGS

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SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install aluminum storefront entry and window systems, including hardware, glazing, and caulking, as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
   2. Section 08 8100: 'Glass Glazing' for quality of glass glazing.

1.2 REFERENCES

A. Association Publications:
   1. American Architectural Manufacturers Association (AAMA):
      a. AAMA 501-15, 'Methods of Test for Exterior Walls'.
      b. AAMA 609 & 610-15, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents).
      c. AAMA SFM 1-14, 'Aluminum Store Front and Entrance Manual'.
      d. AAMA 611-14, 'Voluntary Standards for Anodized Architectural Aluminum'.
      e. AAMA 2605-17a, 'Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels'.

B. Definitions:
   1. Glass Surface:
      a. Insulated glass unit:
         1) Surface 1: Exterior surface of outer lite.
         2) Surface 2: Interspace-facing surface of outer lite.
         3) Surface 3: Interspace-facing surface of inner lite.
         4) Surface 4: Interior surface of inner lite.
      b. Monolithic glass:
         1) Surface 1: Exterior surface.
         2) Surface 2: Interior surface.

C. Reference Standards:
   1. American National Standards Institute / Builders Hardware Manufacturers Association:
      a. ANSI/BHMA A156.19-2013, 'Power Assist & Low Energy Operated Doors'.
   2. ASTM International:
      a. ASTM B221-14, 'Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes'.
      b. ASTM B456-17, 'Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium'.
      c. ASTM B633-15, 'Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel'.
      d. ASTM C920-18, 'Standard Specification for Elastomeric Joint Sealants'.
      e. ASTM C1184-18, 'Standard Specification for Structural Silicone Sealants'.
      f. ASTM E283-04(2012), '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 E330/E330M-14, 'Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference'.

h. ASTM E331-00(2016), ‘Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference’.
3. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
   a. Chapter 10, 'Means of Egress'.
   b. Chapter 16, 'Structural Design'.
      1) Section 1609 'Wind Loads'.
4. International Code Council / American National Standards Institute:
   a. ICC / ANSI A117.1-2009, ‘Accessible and Usable Buildings and Facilities'.
5. National Fenestration Rating Council (NFNC):
   a. NFRC 100-2017, 'Procedure for Determining Fenestration Product U-factors’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference as specified in Section 06 1100.
      a. Schedule pre-installation conference one (1) week before scheduled installation of storefront system.
      b. In addition to requirements of Section 01 3100, review following:
         1) Review rough opening requirements:
            a) Make certain rough openings are within tolerances required for installation of factory-fabricated frames.
            b) These dimensions have been agreed upon between Owner and Manufacturer and are shown on Standard Plan Drawings.
         2) Review rough opening requirements:
            a) Existing Building:
               (1) Field verify rough openings before fabrication of storefront entrances.
         3) Review installation scheduling, coordination, placement of doors.
         4) Review low-energy door operator location and requirements.
         5) Review delivery, storage, and handling requirements.
         6) Review 'Examination' requirements before sliding door installation.
         7) Review 'Finish' door and hardware requirements.
         8) Review 'Protection' responsibilities.
         9) Review 'Cleaning' responsibilities.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature.
         1) Storefront entry system.
         2) Low-energy door operator.
      b. Color and finish.
   2. Shop Drawings:
      a. Clearly mark components to identify their location in Project.
      b. Show locations, sizes, etc, of hardware reinforcing.

B. Informational Submittals:
   1. Qualification Statement:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, adjustment, and repair instructions.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.

a) Storefront warranty.
b) Storefront closers.
c) Low-energy door operator.

c. Record Documentation:
1) Manufacturers documentation:
a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
b) Manufacturer’s literature of cut sheets for low-energy door operators.
c) Color and finish selections.
d) Parts lists.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Storefront System Performance Requirements:
a. Provide test reports from AAMA accredited laboratories certifying performances if requested:
1) Air Leakage: Meet requirements of ASTM E283.
2) Limit air leakage through assembly to 0.06 CFM/min/sq ft (.00003 m3/sm2) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E283.
3) Water Resistance: No water leakage when measured in accordance with ASTM E331 with static test pressure of 8PSF (384 Pa) as defined by AAMA 501.
4) Dynamic Water Resistance: No water leakage, when measured in accordance with AAMA 501 with dynamic test pressure of 8 PSF (384 Pa).
5) Limit mullion wind load deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E330/E330M.
6) System shall not deflect more than 1/8 inch (3 mm) at center point, or 1/16 inch (1.58 mm) at enter point of horizontal member, once dead load points have been established.
7) System shall accommodate expansion and contraction movement due to surface temperature differential of 180 deg F (82 deg C).
8) Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Manufacturer Qualifications:
a. Provide aluminum entrances and storefront systems produced by firm experienced in manufacturing systems that are similar to those indicated for this project and have record of successful in-service performance.
2. Fabricator Qualifications:
a. Provide aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and have record of successful in-service performance.
b. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.
3. Installer Qualifications:
a. Minimum three (3) years experience in storefront installations.
b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
c. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver all parts of door, together with hardware, in original, unopened packages with labels intact to Project at same time.

B. Storage And Handling Requirements:

1. Store in clean, dry location, indoors in Manufacturer's unopened packaging until ready for installation and in accordance with Manufacturer's instructions.
2. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.
3. Protect materials and finish from damage during storage, handling and installation.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Storefront Entrances:
      a. Manufacturer's Warranty to be free of defects in material and workmanship.
      b. Manufacturer's Warranty against deterioration or fading.
      c. Manufacturer's Lifetime Warranty for Door Construction for normal use.
   2. Closers:
      a. Closer Manufacturer's standard warranty, 10 years minimum.
   3. Low-Energy Door Operator:
      a. Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Category Three Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      a. Arcadia Inc., Vernon CA www.arcadiainc.com.
         1) Contact Information: Ken Martinek, (602) 734-5327 kmartinek@arcadiainc.com.
      b. Kawneer North America, Norcross, GA, www.kawneer.com/kawneer/north_america.
         1) Contact Information: Bart Daniels cell (385) 214-4650 bart.daniels@alcoa.com.

B. General:
   1. In addition to requirements shown or specified, comply with:
      a. Applicable provisions of AAMA SFM 1, 'Aluminum Store Front and Entrance Manual' for design, materials, fabrication and installation of component parts.

C. Design Criteria:
   1. Storefront System suitable for outside or inside glazing.

D. Materials:
   1. Framing Components and Accessories:
      a. Aluminum Extrusions:
         1) 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.
         2) Anchors, Clips, and Accessories:
            a) Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated (properly isolated steel from aluminum).
         3) Fasteners:
            a) Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
         4) Glazing Gasket:
            a) Compression-type design with replaceable extruded EPDM rubber.
         5) Reinforcing Members:
            a) Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other

suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
b) Mullion:
(1) Steel reinforced or heavy duty as necessary to prevent lateral flexing of mullion.
6) Sealant:
a) Structural Sealant meeting requirements of ASTM C1184 for fabrication within storefront system:
(1) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.
(2) Single-component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
(3) Color: Black.
b) Joint Sealants used at perimeter of storefront framing system: Elastomeric Sealant as specified in Section 07 9213.
c) Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.
7) Tolerances:
a) Tolerances for wall thickness and other cross-sectional dimensions of storefront members in compliance with AA Aluminum Standards and Data.
b. Storefront Framing System:
1) Brackets and Reinforcements:
a) Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
2) Fasteners and Accessories:
a) Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
3) Perimeter Anchors:
a) When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
c. Finish:
1) Match doors.
d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Non-Thermal, 2 inch (50 mm) Sightline:
a) Double Stack header at exterior doors only if shown on Contract Drawings.
b) Single Glazed:
(1) AR450 by Arcadia.
(2) Trifab VG 450 by Kawneer.
c) Double Glazed:
(1) AG451 by Arcadia.
(2) Trifab VG 451 by Kawneer.
2. Manually Operated Doors:
a. Aluminum:
1) 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.
b. Stiles:
1) 3-1/2 inches by 1-3/4 inches by 0.125 inches (89 mm by 45 mm by 3.175 mm) thick nominal.
c. Top Rails:
1) 3-1/2 inches minimum by 1-3/4 inches by 0.125 inches (89 mm minimum by 45 mm by 3.175 mm) thick nominal.
d. Bottom Rails:
1) 10 inches minimum by 1-3/4 inches by 0.125 inches (254 mm minimum by 45 mm by 3.175 mm) thick nominal.
e. Construction:
1) Manufacturer's standard.
f. Glazing Stops:
1) Snap-in type with neoprene bulb-type glazing. Units shall be glazed from exterior side.
g. Weatherstripping:

1) Neoprene bulb-type.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   a) Peri-Plus Seal (PPS) by Arcadia.
   b) Sealair by Kawneer.

h. Framing System Gaskets and Sealants:
1) Manufacturer's standard, recommended by manufacturer for joint type:
2) Sealants: As specified in Framing Components and Accessories.

i. Factory Finishing:
1) Clear Anodized Aluminum Finish (match existing):
   a) Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; clear coating 0.40 mils (0.01016 mm) to 0.70 mils (0.01778 mm) thick) complying with AAMA 611.

j. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Non-Thermal:
   a) MS362 Medium Stile by Arcadia.
   b) 350 Medium Stile by Kawneer.

3. Glazing:
a. Glazing as specified in Section 08 8100: 'Glass Glazing'.
b. Glazing Gaskets:
1) Compression-type design with replaceable extruded EPDM rubber.
c. Spacers and Setting Blocks: Elastomeric.
d. Bond-Breaker (Sealer) Tape: Standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
e. Glazing Sealant:
1) Structural Sealant meeting requirements of ASTM C1184:
   a) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.
   b) Single-component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
   c) Color: Black.
2) Weather Sealant:
   a) ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weather seal sealant, and aluminum-framed-system manufacturers for this use.
   b) Color: Match structural sealant.
3) Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.

4. Hardware:
a. Hinging:
1) Top and bottom offset, ball bearing pivots per door leaf.
b. Thresholds:
1) Interior:
   a) Design Criteria: Meet handicap accessibility requirements.
   b) Carpet Tile / Carpet to Carpet: Similar to Pemko 236.
c. Sweep Strips:
1) Class Two Quality Standard:
   a) Entrance Manufacturer's standard (cover cap with no exposed fasteners).
   b) Pemko 293100 N8.
d. Push / Pulls:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   a) PBR and OPR-9 by Arcadia.
   b) Kawneer CP and CO-9, clear anodized.
e. Removable Mullion:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
2) Von Duprin 4954 steel mullion with KR4954 lock assembly.
f. Kick Plates:

1) Push side of Door only.
2) 10 inches (254 mm) high by width of door less 3/4 inch (19 mm) on each side.
3) Material: 0.050 inch (1.27 mm) thick Stainless Steel.
4) Type Two Acceptable Manufacturers:
   a) Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
   b) Hager, St Louis, MO (800) 255-3590 or (314) 772-4400 www.hagerhinge.com.
   c) Ives, Wallingford, CT www.iveshardware.com.
   d) Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
   e) Equal as approved by Architect before bidding. See Section 01 6200.

E. Fabrication:
1. Construction shall meet Manufacturer's recommendations.
2. Fabricate components that, when assembled, have following characteristics:
   a. Profiles sharp, straight, and free of defects or deformations.
   b. Accurately fit joints; make joints flush, hairline and weatherproof.
   c. Means to drain water passing joints, condensation within framing members, and moisture migrating within system to exterior.
   d. Physical and thermal isolation of glazing from framing members.
   e. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   f. Provisions for field replacement of glazing.
   g. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   h. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements and for hardware attachment.
3. Fabricate in factory to dimensions required to fit framed openings detailed on Contract Documents. Joints shall be tightly closed.
4. Mortise in manner to give maximum hardware-door connection strength and neatness of appearance. Adequately reinforce with back plates or rivnuts to hold pivots and closers.
5. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
6. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
7. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.
8. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

F. Hardware Finishes:
1. Finishes for steel, brass, or bronze hardware items shall be satin chromium plated.
2. Materials other than steel, brass, or bronze shall be finished to match the appearance of satin chromium plated.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Performance Standard Installers: See Section 01 6200 for definitions of Categories. See Section 01 4301 and 'Quality Assurance' in Part 1 'General' for Installer Qualifications of this specification:
1. General Contractor responsible for Installer(s), verification of qualifications, and performance. Contact Approved Manufacturer's Representative specified in Part 2 'Products' of this specification for potential installers if desired.

3.2 EXAMINATION

A. Verification Of Conditions:
1. Verify that framed openings comply with Contract Document requirements.

2. Verify floor is level across entire width of automatic door opening.
3. Verify sill conditions are level and/or sloped away from openings as specified.
4. Verify wall framing is dry, clean, sound, and free of voids and offsets, construction debris, sharp edges or anything that will prevent a successful installation of storefront system.
5. Notify Architect and Owner in writing if framed openings are not as agreed upon.
   a. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected to allow installation of standard entries and windows.
   b. Commencement of Work by installer is considered acceptance of substrate.

3.3 INSTALLATION

A. General:
1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
2. All installation shall be in accordance with manufacturer's published recommendations and in accordance with approved shop drawings.
3. Do not install damaged components. Fit frame joints tight, free of burrs and distortion. Rigidly secure non-movement joints.
4. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by applying sealer tape to prevent electrolytic action.

B. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
1. Variation from plane: Limit to 1/8 inch (3 mm) in 12 feet (3.6 meters); 1/4 inch (6 mm) over total length.
2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.6 mm).
3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch (0.8 mm).
4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

C. Install doors without warp or rack. Adjust doors and hardware to provide ninety (90) degree operation, tight fit at contact points and smooth operation.

D. Thresholds:
1. Accurately cut thresholds to fit profile of storefront frame. Bed exterior thresholds in specified sealant at contact points with floor and make watertight.

E. Sealants:
1. Apply in accordance with Section 07 9213 'Elastomeric Joint Sealant' requirements.
2. Caulk joints between frames and walls, both interior and exterior to provide weather tight installation.

F. Glazing Characteristics:
1. Interior Vestibule Glazing: Clear.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Pull test doors, especially pairs of single doors separated by permanent mullions, to ensure security of opening.
2. Make all necessary final adjustments to attain normal operation of each door and its mechanical hardware.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
1. Correct any work found defective or not complying with contract document requirements including removal and replacement of glass that has been broken, chipped, cracked, abraded, or damaged during construction period at no additional cost to the Owner.

3.5 ADJUSTING

A. Adjust swing doors for proper operation after glazing entry. After repeated operation of completed installation, re-adjust door for optimum operating condition and safety if required.

3.6 PROTECTION

A. During Installation:
   1. Installer's Responsibility:
      a. During installation, all adjacent work shall be protected from damage.

B. After Installation:
   1. General Contractor's Responsibility:
      a. Institute protective measures required throughout remainder of construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

3.7 CLEANING

A. General:
   1. Installer's Responsibility:
      a. Follow Manufacturer's written recommendations for cleaning and maintenance or guidelines of AAMA 609 & 610 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents). Avoid damaging protective coatings and finishes.
      b. Clean glass and aluminum surfaces, inside and out, promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Exercise care to avoid damage to coatings.
      c. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
         1) Do NOT remove permanent AAMA/CSA or NFRC labels.

B. Waste Management:
   1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

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SECTION 08 8100

GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of glazing used in entries, doors, and windows.

B. Related Requirements:
   1. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.

1.2 REFERENCES

A. Definitions:
   1. Glass Surface:
      a. Insulated glass unit:
         1) Surface 1: Exterior surface of outer lite.
         2) Surface 2: Interspace-facing surface of outer lite.
         3) Surface 3: Interspace-facing surface of inner lite.
         4) Surface 4: Interior surface of inner lite.
      b. Monolithic glass:
         1) Surface 1: Exterior surface.
         2) Surface 2: Interior surface.
   2. Insulated Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
   3. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
   4. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.
   5. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
   6. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
   7. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
   8. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
   9. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
   10. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

B. Reference Standards:

1. American National Standards Institute:
   a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test'.
2. ASTM International:
   a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
   b. ASTM C1048-18, 'Standard Specification for Heat-Treated Flat Glass - Kind H, Kind FT Coated and Uncoated Glass'.
   c. ASTM C1172-14, 'Standard Specification for Laminated Architectural Flat Glass'.
   d. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
   e. ASTM E2190-10, 'Standard Specification for Insulating Glass Unit Performance and Evaluation'.
3. Consumer Products Safety Commission (CPSC):
   a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's data sheets for each glass product and glazing material.

B. Informational Submittals:
   1. Qualification Statement:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.
   2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.

B. Qualifications:
   1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
      a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
      b. Upon request, submit documentation.

C. Certifications:
   1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
   2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
   3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.

2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage And Handling Requirements:
1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
3. Protect edge damage to glass, and damage/deterioration to coating on glass.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.7 WARRANTY

A. Manufacturer Warranty:
1. Insulating Glass Warranty:
a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten [10] years of date of installation.
2. Installer's Warranty:
a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
1. Manufacturer Contact List for Low E Glazing:
a. AGC Flat glass North America, Kingsport, TN www.us.agc.com.
b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN www.carlex.com.
c. Guardian Industries Corp., Auburn Hills, MI www.guardian.com.
d. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.
e. Pilkington North America Inc., Toledo, OH www.pilkington.com.
f. Vitro Architectural Glass (formerly PPG glass), Cheswick, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

B. Storefront Glazing:
1. Thickness: 1/4 inch (6 mm).
2. Glazing shall have following characteristics:
a. Low-Emissivity (or Low E):
1) Design Criteria:
a) Clear.
b) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (13 mm) airspace and two (2) 1/4 inch (6 mm) lites.
c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
d) Location: Surface 2.
2) Type Two Low-Emissivity (or Low E) Acceptable Product:
a) Performance Standard:

(1) 64 percent Visible Light Transmission (VLT).
(2) 0.28 U-value winter.
(3) 0.26 U-value summer.
(4) 0.27 Solar Heat Gain Coefficent (SHGC).
(5) 0.32 Shading Coefficient.
(6) 12 percent Visible Light Reflectance.

b) Quality Standard:
(1) Cardinal LoE³-366.
(2) Solarban 70 XL.
(3) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.

3) Acceptable Manufacturers:
a) AGC.
b) Guardian.
c) Vitro Architectural Glass.
d) Equal as approved by Architect before bidding. See Section 01 6200.

b. Glazing Below Door Height:
1) Design Criteria:
a) Tempered.
b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

C. Fabrication:
1. Except where glass exceeds 66 inches (1 675 mm) in width, cut clear glass so any wave will run horizontally when glazed.
2. Sealed, Insulating Glazing Units:
a. Double pane, sealed insulating glass units. Install at exterior windows and exterior aluminum-framed storefront.
b. Unit Thickness: 5/8 inch (16 mm) minimum, one inch (25 mm) maximum.
c. Type Seal:
1) Metal-to-glass bond and separated by 1/2 inch (12.7 mm) dehydrated air space.
2) Use non-hardening sealants.
d. Category Four Approved Fabricators. See Section 01 6200 for definitions of Categories.
1) Members of Sealed Insulating Glass Manufacturer's Association.

2.2 ACCESSORIES

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

PART 3 - EXECUTION: Not Used

END OF SECTION

DIVISION 09: FINISHES

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SECTION 09 9001

COMMON PAINTING AND COATING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common procedures and requirements for field-applied painting and coating.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
   2. Sections under 09 9000 heading ‘Paints and Coatings’.
      a. Pre-Installation conferences held jointly with Section 09 9001.

1.2 REFERENCES

A. Definitions:
   1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
   2. Gloss Levels:
      a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level ‘1’	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level ‘2’	High side sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘3’	Traditional 'eggshell-like finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘4’	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level ‘5’	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level ‘6’	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level “7’	High gloss	More than 85 units at 60 degrees.

   3. Properly Painted Surface:
      a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet (1.50 m) minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
   4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

B. Reference Standards:
   1. The latest edition of the following reference standard shall govern all painting work:
      a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

b. MPI(r), 'Maintenance Repainting Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
   a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading ‘Paints and Coatings’.
   b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading ‘Paints and Coatings’.
   c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
2. In addition to agenda items specified in Section 01 3100, review following:
   a. Review Quality Assurance for Approval requirements.
   b. Review Quality Assurance Field Sample requirements.
   c. Review Submittal requirements for compliance for MPI Approved Products.
   d. Review Design Criteria requirements.
   e. Review Cleaning requirements.
   f. Review painting schedule.
   g. Review safety issues.
3. Review additional agenda items from Sections under 09 9000 heading ‘Paints and Coatings’.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
   a. Include following information for each painting product, arranged in same order as in Project Manual.
      1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
      2) Provide one (1) copy of ‘MPI Approved Products List’ showing compliance for each MPI product specified.
         a) MPI Information is available from MPI Approved Products List using the following link: http://www.paintinfo.com/mpi/approved/index.shtml.
      3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.

B. Informational Submittals:
1. Manufacturer Instructions:
   a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
2. Qualification Statement:
   a. Applicator:
      1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Record Documentation:
      1) Manufacturer’s documentation:
         a) Manufacturer's cut sheet for each component of each system.
         b) Schedule showing rooms and surfaces where each system was used.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approval:
   1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
   2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
   3. Master Painters Institute (MPI) Standards:
      a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
      b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.

B. Qualifications:
   1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
      a. Minimum five (5) years' experience in painting installations.
      b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
      c. Maintain qualified crew of painters throughout duration of the Work.
      d. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
   2. Deliver amount of materials necessary to meet Project requirements in single shipment.

B. Storage And Handling Requirements:
   1. Store materials in single place.
   2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
   3. Maintain storage area at 55 deg F (13 deg C) minimum.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for exterior work.
   2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
      a. Inspection of painting work shall take place under same lighting conditions as application.
      b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
   1. Design Criteria:
      a. Provide materials for use within each coating 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.
      b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).

c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.
d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
e. Where specified paint system does not have Premium Grade, provide Budget Grade.
f. Provide products of same manufacturer for each coat in coating system.
g. Color Levels:
    1) Color Level II:
        a) Number and placement of exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
        b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.
    2) Color Level III:
        a) Number and placement of exterior paint colors and gloss levels shall be Color Level III from MPI Manual, PDCA P3-93 as modified in following paragraph.
        b) Several paint colors or gloss levels will be selected for same substrate within designated interior rooms or exterior areas.

B. Materials:
1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.

B. Pre-Installation Testing:
1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.

C. Evaluation And Assessment:
1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.2 PREPARATION

A. Protection Of In-Place Conditions:

1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
   a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.

B. Surface Preparation:
1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

3.3 APPLICATION

A. Interface With Other Work:
1. Coordinate with other trades for materials and systems that require painting before installation.
2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.

B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.
1. Paint mechanical that require field painting as indicated in Contract Documents. These include but are not limited to:
   a. Mechanical flues and pipes penetrating roof.

C. Apply sealant in gaps 3/16 inch (5 mm) and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.

D. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.

E. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.

F. Touch up suction spots after application of first finish coat.

G. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.

H. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.

I. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.

2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.5 CLEANING

A. General:
   1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

B. Waste Management:
   1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
   2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
   3. Remove debris caused by work of paint Sections from premises and properly dispose.
   4. Retain cleaning water and filter out and properly dispose of sediments.

END OF SECTION

SECTION 09 9113

EXTERIOR PAINTED GALVANIZED METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new exterior exposed galvanized metal surfaces as Described in Contract Documents.
   2. Preparing and painting following existing exterior exposed galvanized metal surfaces as described in Contract Documents.
      a. Roof Jacks.
      b. Pipe Vents.
      c. Flues.
      d. Any other roof penetrations as needed.

B. Related Requirements:
   1. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. All Other:
      a. New Surfaces: Use MPI(a) EXT 5.3H Latex Finish system.
      b. Previously Finished Surfaces: Use MPI(r) REX 5.3H Latex Finish system.

C. Performance:
   1. Design Criteria:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
      c. Sound Existing Surfaces: MPI Custom Grade finish requirements.
      d. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. Polyurethane:
      a. Vinyl Wash Primer Coat: MPI Product 80: ‘Primer, Vinyl Wash’.
      b. Finish Coats:

1) Epoxy MPI Product 101: ‘Primer, Epoxy, Anti-Corrosive, for Metal’.
2) Polyurethane MPI Product 72: ‘Polyurethane, Two-Component, Pigmented, Gloss (MPI Gloss Level 6-7)’.

2. Latex:
   a. Waterborne Primer Coat: MPI Product 134: ‘Primer, Galvanized, Water Based’.
   b. Finish Coats: MPI Product 11: ‘Latex, Exterior Semi-Gloss (MPI Gloss Level 5)’.

PART 3 - EXECUTION

3.1 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. New Surfaces:
1. Clean 'passivated' or 'stabilized' galvanized steel as specified in SSPC-SP1.
2. After removal of 'passivated' or 'stabilized' coating or for surfaces without coating, clean surfaces to be painted with mineral spirits or product recommended by Paint Manufacturer. Change to clean rags or wiping cloths regularly to reduce possibility of re-contamination of surface.
3. Apply prime coat.
4. Apply finish coats.

C. Existing Painted Surfaces:
1. Remove deteriorated and chalked existing paint and rust deposits down to sound substrate by sanding, scraping, or wire brushing.
2. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
3. Apply prime coat.
4. Apply finish coats.

D. Existing Unpainted Surfaces:
1. Wirebrush or power wash as necessary to remove 'white rust'.
2. Apply prime coat.
3. Apply finish coats.

END OF SECTION

DIVISION 26: ELECTRICAL

26 0500 COMMON WORK RESULTS FOR ELECTRICAL

END OF TABLE OF CONTENTS

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SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
   3. Make electrical connections to equipment provided under other Sections.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, National Electric Code (NEC).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250, ‘Enclosure for Electrical Equipment (1000 Volts Maximum)’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 0520: 'Heating Cables' for heating cable equipment.
      c. Do not purchase equipment before approval of product data.
   2. Shop Drawings:

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Report of site tests, before Substantial Completion.
   2. Qualification Statement:
      a. Electrical Subcontractor:
         1) Provide Qualification documentation if requested by Architect or Owner.
      b. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
      b. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature.

b) Include copy of approved shop drawings.
c) Provide tritium exit sign tabulations for each exit sign installed on Project including following:
   (1) Serial number.
   (2) Expiration number.
   (3) Installed building location (example – chapel north rear exit, north corridor east end, main west foyer, etc.).

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
   2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
   1. Electrical Subcontractor:
      a. Company specializing in performing work of this section.
         1) Minimum five (5) years experience in electrical installations.
         2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
      b. Upon request, submit documentation.
   2. Installer:
      a. Licensed for area of Project.
      b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
      c. Upon request, submit documentation.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

B. Evaluation And Assessment:
   1. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.

3.2 PREPARATION

A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.

B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.

C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.

D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.

E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

3.3 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Architect of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
   2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

3.5 CLEANING

A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

3.6 CLOSEOUT ACTIVITIES

A. Training:
   1. Provide competent instructor for three (3) days to train Owner’s maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

END OF SECTION

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SECTION 26 0520

HEATING CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install electric heating cable system for rain gutters and roof eaves as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Rain Gutter and Roof Eaves:
         1) Show layout spacing and cable sizing required by Cable Manufacturer for site conditions. Provide watts per lineal feet at required AC voltage for cable to be used.

B. Informational Submittals:
   1. Qualification Statements:
      a. Installer:
         1) Show Factory Certification if required.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Include copy of final, executed warranty.

1.3 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies but not limited to following:
   1. Installers:
      a. Installer shall be performed by Factory Certified Installer.
      b. Provide documentation if requested by Architect.

1.4 WARRANTY

A. Manufacturer Warranty:
   1. Rain Gutter System:
      a. Manufacturer's ten (10) year warranty covering workmanship and defective materials.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:
   a. Bylin Engineered Systems, El Dorado Hills, CA www.bylinusa.com.
   b. Easy Heat, East Granby, CT www.easyheat.com or EasyHeat Ltd, Waterloo, ON (800) 794-3766 or (519) 885-2850.
   c. Heat Trace Products, LLC. Leominster, MA www.rscc-heattrace.com.
   d. Nelson Heat Tracing Systems, East Granby, CT www.nelsonheaters.com.
   e. Pass & Seymour, Syracuse, NY or Pass & Seymour Canada Inc, Concord, ON www.passandseymour.com.
   f. ProLine, Draper, UT www.prolineradiant.com.
   g. Raychem Corporation, Menlo Park, CA www.tycothermal.com or Raychem Canada Ltd, Toronto, ON (800)988-5171 or (416) 234-0886. Raychem sold thru Pentair, Houston, TX www.pentairthermal.com.
   h. Square D Co, Palatine, IL www.us.squared.com or Square D Co / Schneider Electric, Toronto, ON (800) 565-6699 or (416) 752-8020.
   i. Technitrace Inc, Murray, UT www.technatrace.com.
   j. Thermon Manufacturing Co, San Marcos, TX www.thermon.com.
   k. WarmZone Inc, Salt Lake City, UT www.warmzone.com.

B. Materials:
   1. Rain Gutter And Roof Eave Heaters:
      a. Cable:
         1) Class One Quality Standard. See Section 01 6200 for quality standard definition:
            a) Raychem GM-1X.
      b. Temperature And Moisture Sensors:
         1) Design Standard:
            a) Gutter Sensor: GIT-1 by Raychem.
            b) Roof Sensor: CIT-1 by Raychem.
      c. Contactor (if required):
         1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
            a) Easy Heat: PC series.
            b) Square 'D': Class 8502.
      d. Pilot Light:
         1) Include plate with engraved text, 'ROOF HEATING CABLE'.
         2) Class Two Quality Standard. See Section 01 6200 for quality standard definition:
            a) Pass & Seymour 2151 Red.
      e. Factory prepared, UL / ULC recognized splice and termination kits by Cable Manufacturer.
      f. Controller:
         1) Class Two Quality Standard. See Section 01 6200 for quality standard definition:
            a) Pertair by Raychem PD Pro for 120V or GF for 200-277V.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Install electric heating cable not to void Roofing Manufacturer system warranty.
   2. Provide materials and labor including engineering if required, to prevent and remedy damage to roof integrity.

B. Rain Gutter And Roof Eave Heaters:
   1. Install moisture probes for controller in rain gutter and roof.
   2. Install pilot light in corridor or foyer to indicate when cables are operating.
   3. Terminate raceway on exterior of building at heat cable location with weatherproof junction box.
   4. Install cable using approved spacers and without penetrating rain gutter or roofing material.
   5. Install all cable, controllers, sensors and etc. per Manufacturer's written installation instructions.

3.2 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to Owner.
   2. Correct any damage to roofing material at no additional cost to Owner.

END OF SECTION

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