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BIDDING REQUIREMENTS

SAMPLE FORMS, ETC

FIXED SUM PROJECT (U.S.)

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INVITATION TO BID (U.S.)

1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:

Dynamic Construction
Gines Construction
Philipoom Construction
Saunders Construction
Stallings Construction
Warner Construction

2. PROJECT:

Project Number: 505-1975
Cherry Hill 1, 2, 4 Restroom
Orem UT Cherry Hill Stake

3. LOCATION:

1700 South 400 East
Orem, UT 84058

4. OWNER:

Corporation of the Presiding Bishop of
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
American Fork Project Management Office
Tom Howell

5. CONSULTANT:

BHD Architects
Lafe Harris

6. DESCRIPTION OF PROJECT:

- A. Mother's Room remodel, Serving Area remodel, and new accordion folding partition.
- 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 and publicly opened on Fri, 22 Jun 2018 at 2:00 PM in the Relief Society Room of the LDS Meetinghouse at 850 North 900 East, American Fork, UT 84003.

10. BIDDING DOCUMENTS:

- A. Bidding Documents may be examined at the following plan room locations:
 - 1) Dodge Data and Analytics

Office# (859) 885-1091 / Cell# (417) 860-0242
Fax # (801) 606-7722
email:Sherry.roe@construction.com

2) Mountainlands Area Plan Room
Office (801) 288-1188 Fax (801) 288-1184
Contact: Mike Luke
Email: mike@maprutah.com

- B. Bidding Documents may be obtained at the Architect's office with a refundable deposit of \$n/a 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

_____ Cherry Hill 1, 2, 4 Restroom _____
 _____ 505-1975 _____

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 1700 South 400 East, Orem, UT 84058 on Wed, 13 Jun 2018 at 2:00 PM.
- 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) Nick Cluff, Orem South FM Group, 801.222.3160, 1035 South 800 East, Orem, UT 84059
- D. Exemption from local taxes - See Supplementary Conditions

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:** _____

B I D F O R M

FOR GENERAL CONTRACT WORK (U.S.)

PROJECT IDENTIFICATION:

Property Number: 505-1975
Cherry Hill 1, 2, 4 Restroom
Orem UT Cherry Hill Stake

OWNER:

Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints, a Utah corporation
sole ("Owner")
Tom Howell
American Fork Project Management Office

ARCHITECT:

BHD Architects
Lafe Harris

B I D

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	
_____	City, State, and Zip Code	
_____	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: _____

Building Plan Type: _____

Building Address: _____

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

Project Number: _____

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

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

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, 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. **Relationship of the Parties.** 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: Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.	CONTRACTOR: (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 willful 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, attorneys' 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, attorneys' 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 amounts specified in Supplementary Conditions;

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 as the Certificate Holder 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 higher. 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 in Section 11.1 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, attorneys' 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, Physical 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 attorneys 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 attorneys 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 term of the Contract Documents, the prevailing party will be entitled to recover its attorneys 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 Contract 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 \$250.00 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 \$250.00 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 \$125 per day.

ITEM 3 - PERMITS

1. Delete Section 3.6, Paragraph B of the General Conditions and replace with the following:
 - B. Contractor will obtain and pay for the building permit, and all other permits, utility connection fees, governmental fees, and inspections necessary for the proper execution and completion of the Work. Do not include these fees in the Bid Amount. The Owner will reimburse the Contractor for the payment of these permits and fees. The reimbursement of these permits and fees will not be part of and will be processed separately from the project's Contract Sum.

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; and
 - 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 listing 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 B+ Class VII or higher. 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 in Section 11.1 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

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.

1.3 WORK BY OWNER

- A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
1. General:
 - a. Complete work necessary to accommodate work to be performed by Owner 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.
 - b. Store and protect completed work provided by Owner until date of Substantial Completion.
 2. Work furnished and installed by Owner include, but are not limited to, following:
 - a. High Security Cylinders and Cores:
 - b. Selected Commercial Toilet Accessories.
 - c. Carpet and Carpet Base.
 - d. Owner will terminate building telephone cables at terminal board.
 - e. Pews.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

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 may issue separate contracts for operations scheduled to precede and be substantially completed before beginning of The Work under this Contract.
1. Contractor will be given written notice from such contractors of any revisions to scheduled completion of their work at least 30 days in advance. Owner will reimburse Contractor for expenses incurred by Contractor by failure to be properly notified.
- B. 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. Accordion Folding Partitions. See Section 10 2233.
 3. Basketball Equipment. See Section 11 6624.
 4. Pews. See Section 12 6713.
 5. Projection Screens. See Section 11 5213.
 6. Sheet Carpeting. See Section 09 6816.
 7. Soap dispensers, paper towel dispensers, and toilet tissue dispensers. See Section 10 2813.
 8. 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. Aggregate Base. See Section 31 1123.
 - b. Air System Testing, Adjusting, and Balance. See Section 01 4546.
 - c. Asphalt Paving. See Section 32 1216.
 - d. Concrete. See Section 03 3111.
 - e. Concrete Moisture Vapor Emission and Alkalinity level. See Section 09 0503, Section 09 6466, Section 09 6519, Section 09 6813, and Section 09 6816.
 - f. Drill-In Mechanical Anchors / Adhesive Anchors / Screw Anchors. See Section 03 1511 and Section 04 0519.
 - g. Fill / Engineering Fill. See Section 31 2323.
 - i. Masonry (Non-structural). Tests and inspections is not required. See Section 04 0501 'Common Masonry Requirements'.
 - j. Reinforcement Bars. See Section 03 2100 (Epoxy-Coated Reinforcement Bars. See Section 03 2116).
 - k. Shop-Fabricated Wood Trusses: Metal Plate Connected Wood Trusses. See Section 06 1753.

- I. Wood Panel Product Sheathing. See Section 06 1636.
- 9. Tile Carpeting. See Section 09 6813.

- C. 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.
 - 2. Furnishings.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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. 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

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

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. Project designation for this Project is LDS 505-1975 Cherry Hill 1, 2, 4, & Mother's Room, Orem UT Cherry Hill Stake.
- B. 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.

1.5 QUALITY ASSESSMENT – CONSTRUCTION CHECKLIST

- A. Contractor shall be responsible for complying with and providing the required documentation for the Quality Assessment – Construction Checklist. Verify that the most current and applicable checklist is used throughout the project. The current checklist is available at http://aec.ldschurch.org/aec/quality_assessment/.
1. Sample checklist:

<p>Grades adjacent to building provide adequate drainage.</p>	<p>Verification Criteria Verify by electronic level that final grades of landscaped and walkway areas provide adequate drainage around the building:</p> <ul style="list-style-type: none"> ● 2% (minimum) slope at lawn areas ● 2% (minimum) slope, 8% (maximum) slope at sidewalks ● 2 horizontal to 1 vertical (maximum) at landscaped areas ● 3 horizontal to 1 vertical maximum slope in lawn areas
<p>Spacing and location of control joints and expansion joints in mow strips, concrete sidewalks and entries are per standard.</p>	<p>Verification Criteria Verify that control joints and expansion joints are installed at the spacings indicated in specification Section 03 3053:</p> <p>Joint sealants are required in all expansion joints noted in specification section 03 3053 (caulk).</p> <p>In sidewalks:</p> <ul style="list-style-type: none"> ● Control joints should be spaced between 4' and 6' on center. ● Expansion joints should be spaced between 40' and 100' on center. <p>In mow strips:</p> <ul style="list-style-type: none"> ● Control joints in mow strips should be between 3' and 5' on center ● Expansion joints should be spaced at 40' to 100' on center.
<p>Water does not pond on pavement, in gutters, and in lawn or landscape areas.</p>	<p>Verification Criteria Verify by electronic level that ponding does not occur on pavement or in gutters:</p> <ul style="list-style-type: none"> ● 2% minimum slope on asphalt paving 5% maximum slope on asphalt paving ● 1% minimum slope on concrete paving 5% maximum slope on concrete paving ● .5% minimum slope in gutters 8% maximum slope in gutters ● 2% minimum slope in lawn areas intended to drain 3 horizontal to 1 vertical maximum slope in lawn areas ● 2% minimum slope in landscaped areas intended to drain 2 horizontal to 1 vertical maximum slope in planter areas

<p>Concrete strength used in site work is per standard.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of concrete test reports that the concrete mix design and tests for concrete strength match specification Section 03 3111.</p> <ul style="list-style-type: none"> ● It should be 4,000 psi (Concrete Mix Type A) unless the geotechnical report requires otherwise. ● For exterior concrete in areas of freeze/thaw, the concrete strength in the Schedule of Construction Materials in the structural drawings should be 4,500 psi (Concrete Mix Type D).
<p>Mix designs used match the specifications of the contract documents and material and workmanship of pavement (asphalt or concrete) are per standard.</p>	<p style="text-align: center;">Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that the mix designs (or specifications) for the paving supplied matches that of the specifications of the contract documents. 2. Provide the specification actually used for the project if other than the specification within the contract specifications. 3. Verify that the reports- <ul style="list-style-type: none"> For asphalt: <ol style="list-style-type: none"> a. For Marshall or Hveem Mix Designs, the compaction of the asphalt is 96% minimum. b. For Superpave Mix Designs, the compaction of the asphalt is between 92% and 96%. For Concrete: <ol style="list-style-type: none"> a. Concrete strength is 4500 psi in freeze thaw areas, 4000 psi otherwise. b. Surfaces are smooth (1/4" in 10').
<p>Proper finish grading depth at lawn areas.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by measurement that top of finish grade in all lawn areas is as follows:</p> <ol style="list-style-type: none"> 1. Sod areas: 2 inches 2. Seed areas: 1 inch
<p>Trees have top 1/3 of burlap / containers removed, are properly staked, and are planted at appropriate depth.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Observe one tree for proper staking (2 - 2" diameter stakes, 5' above ground, connected with a cinch tie), planting depth (2" above finish grade), and that top 1/3 of burlap or container materials were removed. Staking height of evergreen trees should be 6" less than the height of tree.</p>
<p>Proper depth of bark mulch, rock mulch, or decomposed granite are provided in shrub beds.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Observe one shrub bed that a minimum of 3" in depth of specified bark or rock mulch is provided. Exception: A 2" rock mulch depth may be allowed in locations such as Southern Arizona and Southern Nevada where that depth is common.</p>

<p>Installation of valve box assembly.</p>	<p>Verification Criteria Observe one valve box to check dimensions, location of elements and depth as follows: 1. Gravel - Located 4" below lateral line. 2. Action unions - Verify that one is located on each side of valves. 3. Valve locations - Verify that no more than two valves are located in each valve box. 4. Control wire connections - Verify that waterproof wire connectors have been installed properly.</p>
<p>Proper installation and location of drip system and/or spray heads in shrub areas.</p>	<p>Verification Criteria Observe two different heads in shrub areas for depth, location and spacing as follows: 1. Spray heads - 1" below top of concrete, 1" minimum to 3" maximum from edge of concrete, number and location of heads match irrigation plan. 2. Drip system - drip emitter should be located 2" above top of mulch and is visible; emitters are located next to shrubs and trees as per irrigation plan; number and location of heads match irrigation plan.</p>
<p>Proper location and depth of lawn irrigation heads.</p>	<p>Verification Criteria Observe two spray or rotor heads in lawn areas for location, depth and spacing as follows: 1. Rotor - 3/4" minimum, 1 1/2" maximum below top of concrete, 1" minimum to 3" maximum from edge of concrete, number and location of heads match irrigation plan. 2. Spray - 3/4" minimum, 1 1/2" maximum below top of concrete, 1" minimum to 3" maximum from edge of concrete, number and location of heads match irrigation plan.</p>
<p>Lamination and location of irrigation as-built drawing.</p>	<p>Verification Criteria Verify that 11" x 17" copy of the record drawing irrigation plan has been provided at half size, is laminated for protection, and located in the building for easy access to the FM group.</p>
<p>Controller, rain sensor, moisture sensor wire connections and all grounding for lightning protection are properly installed.</p>	<p>Verification Criteria Controller and rain sensor are: 1. Mounted properly with 2" steel conduit. 2. Wired properly with 18 gauge wires connected to controller. 3. Properly grounded for lightning protection with ground wire connected inside of controller.</p>
<p>Smart controller installation is tested and working properly.</p>	<p>Verification Criteria Verify manufacturers checklist is completely filled out and finalized.</p>
<p>Determine that the irrigation main line has been tested.</p>	<p>Verification Criteria Verify by review of observation report from architect or landscape architect that irrigation main line was tested per specification Section 32 8423.</p>

<p>Landscape elements are installed per contract documents.</p>	<p>Verification Criteria Verify by observation that the installation for the number, size, spacing and location of trees, shrubs, ground cover and boulders matches the planting plan.</p>
<p>Meetinghouse Site Management Plan (MSMP) including Topsoil Testing Report was prepared by landscape architect and appropriate FM training completed.</p>	<p>Verification Criteria Review MSMP to verify that: 1. Document follows standard format and is completed. 2. FM and subcontractor have signed the Plant Establishment Period and training verification section of the document. 3. Training is complete.</p>
<p>Exposed concrete foundation has a consistent smooth rubbed surface finish.</p>	<p>Verification Criteria Verify exposed concrete foundation surface has a consistent smooth rubbed finish and is free of rough surfaces, discoloration, broken corners, voids, and/or unrepaired damaged areas.</p>
<p>Brick veneer maintains a consistent overhang of the concrete foundation.</p>	<p>Verification Criteria Verify brick veneer consistently overhangs the face of the foundation. Foundation should not extend past the face of the masonry. Specified overhang ranges from 1/2 inch up to 1-1/4 inch, according to plan type, with an allowed +1/4 inch tolerance.</p>
<p>Veneer brick is uniform in appearance and weep vents are correctly installed.</p>	<p>Verification Criteria 1. Verify brick are laid flush in plane with properly tooled and consistently sized joints. 2. Verify that weep vents are installed at 33 inches maximum spacing, including within bottom courses over door and window heads.</p>
<p>Fascia and soffit are correctly fabricated and installed in weather tight fashion.</p>	<p>Verification Criteria Verify metal surfaces are smooth, and that joints are tight with no gaps.</p>
<p>EIFS is properly installed and properly integrated into building facade.</p>	<p>Verification Criteria Verify EIFS is correctly installed and perimeter edges are properly sealed where abutting dissimilar materials.</p>
<p>Exterior handrails and railings are properly installed and grouted.</p>	<p>Verification Criteria 1. Verify exterior handrails and railings are properly grouted, where applicable. Handrails should be continuous, without interruption or other obstructions (such as skateboard deterrents) in compliance with IBC 1012.4. 2. Verify by measurement installed height is between 34 and 38 inches.</p>
<p>Joint sealants are properly installed.</p>	<p>Verification Criteria 1. Verify joint sealants are installed where dissimilar materials intersect and applied to provide a weather tight seal and prevent entry of insects. 2. Review joint sealant submittal for compliance with specification Section 07 9213 and to verify that no latex based sealant has been used.</p>

<p>Roofing shingles are correctly installed.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify shingle courses are installed in straight, uniform lines with no exposed fasteners. 2. Verify or by photo that each shingle is fastened with four nails minimum, set flush, straight, and secure to roof slope.
<p>Valley metal installation properly tapers with sealed shingle edges.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that valley metal is installed with tapered exposure (about one inch in 11 feet down slope divergence). 2. Verify by touch that cut shingle edges are firmly set in mastic to valley metal and drip edge flashing. 3. Verify water diverter is installed at bottom spill point of valley metal.
<p>Roof flashings, including drip edges and flashings around roof penetrations, are weather tight.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify VTR's are securely installed plumb and properly sealed with flexible rubber flashing that does not significantly reduce inside clear opening of vent pipe. Minimum VTR extension above roof surface (measured on upslope side) is six inches, except in areas where front/snow closure is possible, minimum extension is 10 inches. 2. Verify flues and penthouses are securely installed and sealed with metal flashings and water diverter upslope of penthouse.
<p>Ridge vent is properly installed.</p>	<p>Verification Criteria</p> <p>Verify ridge vent is securely fastened with painted corrosion resistant screws at eight inch spacing (top and skirting), flush to roof slope, and straight. End caps are installed.</p>
<p>Applicable gutters are properly installed with adequate drainage.</p>	<p>Verification Criteria</p> <p>Verify gutters and downspouts are correctly fabricated with smooth metal finish, are properly sealed and sloped.</p>
<p>Tile and grout are properly installed in restrooms, font and serving area.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify tile and grout are installed uniformly and grout is absent of voids, bubbles or cracks. 2. Verify the wall tile colors and pattern comply with the contract documents. 3. Verify that grout is set and not easily removed. 4. Verify wall tile height in restrooms is per standard plan documents. 5. Verify tile is per spec and installed in the proper location. 6. Verify that the joint between the ceiling and wall is level.

<p>Plumbing fixtures are properly mounted and caulked.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify plumbing fixtures are caulked at floors and walls with a continuous, full bead of caulk. 2. Verify by measurement plumbing fixture elevations are: <ul style="list-style-type: none"> - Water closet seat: 17 - 19 inches above the floor - Wall hung urinal: 17-24 inches above floor to the rim - Lavatory: 34 inches maximum above the floor to the higher of the rim or counter surface - Wheel chair drinking fountain: 36 inches maximum to the spout outlet - Standing drinking fountain: 38 - 43 inches to the spout outlet - Accessible urinal: 17 inches maximum above floor to the rim
<p>Rostrum casework, associated ramp and stairs are properly installed with tight joints.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify joints are tight and straight. 2. Verify handrails and base trim are correctly installed. 3. Verify by measurement that ramp and stairs have required 60 inch landings and 12-inch extension of handrails at top and bottom of ramp.
<p>Vinyl and sisal wall coverings are correctly applied.</p>	<p>Verification Criteria</p> <p>Verify vinyl and sisal wall coverings are installed as specified in sections 09 7216 and 09 7226. Verify that seams are tight with no frayed edges and that there are no bubbles or creases.</p>
<p>Wood floor system and aluminum angle base are correctly installed.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify wood floor is free of transverse cupping, severe chatter, and sanding swirl marks. 2. Verify floor finish is uniform without bubbles and embedded dust particles in areas around bottom of exit doors. 3. Verify aluminum angle base is used, installed with no exposed sharp edges, and outside corners are radiused.
<p>Supports are installed for suspended gypsum board ceiling track system. Seismic bracing is correctly installed where applicable.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Supports should be taut and not loose to the touch. 2. For Seismic Category D, E, and F locations, verify from mechanical mezzanine level that required seismic support wires are securely fastened at 45 degree angles from the suspended ceiling grid/track to overhead structure and grid support points are spaced at 12 feet maximum each way. Compression post/struts are correctly installed to restrict vertical movement in ceiling grid.

<p>Hollow metal door frames, including silencers and smoke seals, are installed properly.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify insulation placement in hollow metal door frames by tapping on the frame and listening for a low resonating tone. 2. Verify frame perimeter is properly caulked with no exposed gaps at wall juncture and verify by touch that frame is not bent outward at corners or otherwise damaged. 3. Verify installation of silencers and/or smoke seals on door frames. Smoke seals should be properly compressed when door is fully closed.
<p>Custom casework is properly installed.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify installation of wood veneer on inside face of cabinet doors. 2. Verify installation of melamine on the inside face of cabinets. 3. Verify running book match on outside face of cabinet doors.
<p>Interior wood trim is properly installed.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify wood trim at ceilings in chapel is painted, not stained. 2. Verify that wood trim in other locations is stained. 3. Verify that nail holes are filled and not visible from minimum six feet. 4. Verify that interior trim lengths are not less than 24 inches.
<p>Wood doors are properly hung in the frame with correct gaps between double doors.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify door perimeter gap is uniform as hung in the frame. Door is not warped in place. 2. Gap between double doors is 3/16 inches maximum.
<p>Ceiling sound insulation is properly installed.</p>	<p>Verification Criteria</p> <p>Verify that sound blanket insulation is the correct thickness, is properly and uniformly placed to fit snugly.</p>
<p>The engineered fill is compacted as per contract documents.</p>	<p>Verification Criteria</p> <p>Verify by review of the compaction test reports that engineered fill under the paving and building pad areas has been properly compacted.</p> <ul style="list-style-type: none"> ● Engineered fill under footings is normally compacted to 95%. Verify this with the geotechnical report. ● Engineered fill under slabs on grade is normally compacted to 90%. Verify this with the geotechnical report.
<p>Footings and foundation walls are reinforced as per contract documents.</p>	<p>Verification Criteria</p> <p>Verify by review of the structural engineer's site observation report(s) and at least two photos that the footings and foundation walls are reinforced.</p> <ul style="list-style-type: none"> ● Footings require horizontal reinforcing. ● Walls require vertical and horizontal reinforcing. ● Dowels are required from footings into walls.

<p>Prefabricated trusses are as per contract documents.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of structural engineer's site observation report(s) and at least two photos that the prefabricated wood trusses are acceptable.</p> <ul style="list-style-type: none"> ● Trusses show no signs of breakage or damage ● Trusses are not in contact with the ground ● Trusses elements (top chord, bottom chord, webs) type, size, and placement are correct ● Truss plates type, size, and placement are correct
<p>Structural wall connections to foundations are as per the contract documents.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of the structural engineer's site observation report(s) and at least two photos that:</p> <ul style="list-style-type: none"> ● The walls are attached to the foundation walls with specified anchor bolts. At least one photo should show anchor bolts. ● Washer plates are installed in Seismic Design Categories D, E and F. At least one photo should show washer plates. ● The jambs are attached to the foundation walls with specified holdown anchors. At least one photo should show holdown anchors.
<p>Structural wall sheathing and edge blocking are installed as per the contract documents.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of structural engineer's site observation report(s) and at least two photos that:</p> <ul style="list-style-type: none"> ● The walls are attached to the structure with the specified nails (or staples). At least one photo should show a nail pattern. ● The edge blocking is installed as specified. At least one photo should show edge blocking.
<p>Gable end outlookers and blocking between outlookers are installed as per the contract documents.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of the structural engineer's site observation report(s) and at least two photos that:</p> <ul style="list-style-type: none"> ● Outlookers are attached to the walls with framing anchors or toe nails as specified. At least one photo should show framing anchors or toe nails. ● Blocking between outlookers is installed with framing anchors or toe nails as specified. At least one photo should show blocking and framing anchors or toe nails.
<p>Wood trusses and blocking between wood trusses are installed as per the contract documents.</p>	<p style="text-align: center;">Verification Criteria</p> <p>Verify by review of the structural engineer's site observation report(s) and at least two photos that:</p> <ul style="list-style-type: none"> ● Wood trusses are attached to the walls with the specified framing anchors or toe nails. At least one photo should show framing anchors or toe nails. ● Blocking between wood trusses is installed as specified. At least one photo should show framing anchors or toe nails.

<p>Beam/girder to wall/column connections are installed per the contract documents.</p>	<p>Verification Criteria Verify by review of the structural engineer's site observation report(s) and at least two photos that:</p> <ul style="list-style-type: none"> ● Beams are attached to columns with steel buckets and thru bolts. At least one photo should show a complete beam to column connection. ● Beams are attached to other beams using framing anchors. At least one photo should show a complete beam to beam connection. ● Trusses are attached to walls with framing anchors. At least one photo should show a complete truss to wall connection.
<p>Structural roof sheathing has been properly installed as per contract documents.</p>	<p>Verification Criteria Verify by review of structural engineer's site observation report(s) and at least two photos noting that roof sheathing has been attached per the contract documents.</p> <ul style="list-style-type: none"> ● Nail spacing is typically 6" on center at edges; 12" on center in-field. ● Blocking is installed above all structural walls.
<p>Attachment of the steeple platform to the structure and the attachment of the steeple to the platform are correct and complete.</p>	<p>Verification Criteria Verify by review of structural engineer's site observation report(s) and at least two photos noting that connections of the steeple and platform are complete.</p> <p>The platform is attached to the structure with steel plates, angles and bolts.</p>
<p>Fire sprinkler heads are installed flush with the ceiling.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that concealed fire sprinkler heads are installed flush with ceiling. 2. Unscrew a concealed cover plate and verify deflector drops below ceiling.
<p>Building insulation envelope maintains temperatures above freezing in wet pipe areas.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that gypsum board is installed and holds insulation in place. 2. Verify that gypsum board joints are sealed. 3. Verify that all penetrations are sealed.
<p>Anti-freeze has been added to anti-freeze system by taking a sample at the bottom of the anti-freeze loop. System should not be leaking.</p>	<p>Verification Criteria Open test valve on glycol riser enough to check a small sample for glycol. Solution will be slick (oily) to the touch and colored if glycol has been added. Solution should not be leaking from test valve.</p>
<p>Pressure gauge differential at dry pipe riser.</p>	<p>Verification Criteria Verify by reading pressure of the water gauge and air gauge. Pressures should be significantly different. Water pressure ranges will be 60 to 100 psig. Air pressure ranges are 30 to 50 psig. If pressure readings are the same (within 1 PSIG), the dry system is full of water.</p>

<p>Fire protection system passed the above ground contractor's test.</p>	<p>Verification Criteria Verify by reviewing the completed contractor's test form in the FM O&M manual.</p>
<p>Thermostats are installed properly.</p>	<p>Verification Criteria 1. Verify that the installation CD has been given to FM. 2. Verify set-up of one thermostat by pushing thermostat center button to display set point temperature and push button again to display discharge air temperature.</p>
<p>Remote sensor installation and operation.</p>	<p>Verification Criteria 1. With the system in unoccupied mode, push the over-ride occupancy button. The LED should light up and the furnace turn on. 2. With the RED and BLUE arrows keys, move LED associated with them to the right and to the left. If the LED moves, the sensor is functioning.</p>
<p>RP panels are supplied by approved panel manufacturers.</p>	<p>Verification Criteria Remove cover from panel. Verify that panel builder's sticker is located inside panel. Panel builders are listed in specification Section 23 0933.</p>
<p>Heating is operating.</p>	<p>Verification Criteria On a thermostat perform the following functions: 1. Press Temporary Occupied and wait for furnace to come on. 2. Press Occupied Cool and press the up arrow (raise) to raise cooling set point to 76° F. 3. Press Occupied Heat and press the up arrow (raise) to raise heat set point to bring furnace burner on. 4. Press the center button twice to reveal discharge air temperature. Verify temperature goes up. 5. Press Occupied Heat and press the down arrow (lower) to lower heat set point to original setting. 6. Press Occupied Cool and press the down arrow (lower) to lower cooling set point back to original setting. 7. Press Run Schedule.</p>
<p>Cooling is operating.</p>	<p>Verification Criteria On a thermostat perform the following functions: 1. Press Temporary Occupied and wait for furnace to come on. 2. Press Occupied Heat and push lower button to lower heating set point to 65 F. 3. Press Occupied Cool and push the down arrow (lower) to lower cooling set point to bring condensing unit on. 4. Press the center button twice to reveal discharge air temperature. Verify temperature goes down. 5. Press Occupied Cool and push the up arrow (raise) to raise cooling set point back to original setting. 6. Press Occupied Heat and push the up arrow (raise) to raise heating set point back to original setting. 7. Press Run Schedule.</p>

<p>Outside air damper is operating.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify the damper position by opening access door between manual and motorized outside air dampers. 2. Verify that motorized outside air damper is open in occupied mode and closed in unoccupied mode. 3. Verify that the end of the damper shaft is correctly marked with damper blade orientation. 4. Verify that actuator jaws are clamped securely to shaft. 5. Verify that damper blade is secured to shaft.
<p>Furnace filter that is installed is correct type.</p>	<p>Verification Criteria</p> <p>Open filter door and remove filter. verify filter is one inch thick fiberglass type. Pleated media filters should not be used. Pleated media filters use more energy and may cause the cooling coil to freeze.</p>
<p>Water heater is installed properly and is operational.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify discharge temperature is set at 110° F for an instantaneous type water heater or 140° F for a tank type water heater. 2. Verify hot and cold water pipe is insulated with fiberglass insulation.
<p>Seismic gas valve is installed properly, when applicable.</p>	<p>Verification Criteria</p> <p>Verify seismic gas valve is installed horizontally in gas line, is level, and is attached to the main building wall.</p>
<p>Main electrical system grounding is as shown on electrical single line diagram.</p>	<p>Verification Criteria</p> <p>Verify main grounding conductor is installed at and bonded to building main water line.</p>
<p>Emergency lighting is operational.</p>	<p>Verification Criteria</p> <p>Turn off circuit breaker of circuit feeding lighting in area and observe operation of emergency lighting.</p>
<p>Lightning protection cable is grounded.</p>	<p>Verification Criteria</p> <p>Verify grounding inspection wells are located outside on each side of the chapel.</p>
<p>Electrical panel circuit schedules are accurate.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that each circuit breaker is labeled with a number. 2. Verify that printed circuit schedules are included in panels. 3. Turn off one circuit breaker of lighting to verify accuracy.
<p>Chapel pendant light fixtures are as shown in contract documents.</p>	<p>Verification Criteria</p> <p>Verify pendant lighting fixtures in chapel match the cut sheet in building O&M binder and the catalog number on the fixture schedule matches the catalog number on the cut sheet. Verify fixture location and mounting heights per standard.</p>
<p>Corridor light fixtures are as shown in contract documents.</p>	<p>Verification Criteria</p> <p>Verify that lighting fixtures in corridor match the cut sheet in building O&M binder and the catalog number on the fixture schedule matches the catalog number on the cut sheet.</p>

<p>Exterior lighting photo cells are properly located.</p>	<p>Verification Criteria verify that photo cells are mounted under the soffit and not in direct sunlight.</p>
<p>Sound system is working properly in chapel.</p>	<p>Verification Criteria 1. Turn sound system on. 2. Talk into the pulpit microphone and check that the system is loud enough, that there is no feedback, that it is clear and that there is no distortion. Check sound consistency throughout the chapel (no dead spots).</p>
<p>Cultural center and foyers are receiving chapel sound.</p>	<p>Verification Criteria 1. Turn chapel sound system on. 2. With someone talking into chapel microphone, open folding partitions between chapel and cultural center and listen for chapel sound in cultural center. Volume should be adequate and at about the same or slightly higher volume level than that heard in the chapel. 3. Listen in foyer by adjusting foyer audio control mounted on foyer wall.</p>
<p>Assistive listening system is working properly.</p>	<p>Verification Criteria 1. FM should provide an Assistive Listening System (ALS) receiver and ear piece found in the material center. 2. With chapel sound system on, have someone talk into pulpit microphone. 3. Listen through ALS receiver at rear of cultural center or chapel. The sound should be clear and undistorted.</p>
<p>Audio controls are installed properly.</p>	<p>Verification Criteria 1. Verify sound system controls at side of pulpit are installed as per detail shown on plan furnishings sheet. Color of control plates should match and be squarely mounted. 2. Verify bishop's sound control pedestal is mounted at side of bishopric's seats as detailed in Enlarged Rostrum section of architectural drawings. It should be easy to reach and control by counselor.</p>
<p>Satellite dish is not blocked.</p>	<p>Verification Criteria Verify that landscape (current or future growth), satellite enclosure, and other structures do not partially or fully block the satellite dish.</p>
<p>Satellite audio system is working.</p>	<p>Verification Criteria 1. Turn on chapel sound system. 2. Turn on satellite audio and adjust volume control. Satellite control is located near audio equipment rack. 3. Verify satellite audio in chapel has adequate sound volume and is clear and not distorted.</p>
<p>Listen in the chapel for higher than normal air handling noise.</p>	<p>Verification Criteria With the heating or air conditioning on, listen for distracting noise or vibration produced by the mechanical equipment which is usually caused by fan speed being set higher than needed.</p>

<p>Office door seals are properly installed (includes stake suite).</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that the door seals and threshold are installed correctly so that no light can be seen coming from the office when the door is closed. 2. Sound seals should be installed so they are in compression when the door is in a closed position.
<p>Bishop's offices masking system is working.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify that masking speaker is installed outside Bishop's offices. 2. The sound produced by the masking speakers should not be noticeable 20 feet down the corridor. 3. If door seals and threshold are properly installed, verify that the masking sound isn't too soft. Have two people converse in the office with the door closed and determine if anyone can hear and understand them in the hallway.
<p>Windows and exterior doors are properly installed.</p>	<p>Verification Criteria</p> <ol style="list-style-type: none"> 1. Verify by review of the architect's site observation reports and at least two photos that: <ul style="list-style-type: none"> - Windows are flashed and sealed into opening according to specifications and window manufacture recommendations. - Windows, store front doors, and steel doors are properly sealed and air barrier is properly terminated at each wall opening to provide a weather tight seal.

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. Submit electronic submittals to Architect. Name the digital file according to the following format: Project Name 001 (submittal number) 071113 (specification number) Bituminous Dampproofing (submittal product).
 - 2. 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.
 - 3. 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.
4. 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.
5. 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 3500**SPECIAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

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

1.2 REFERENCES

- A. Association Publications:
1. U.S. Department of Labor, Occupational Safety and Health Administration:
 - a. 29 CFR 1926 OSHA, 'Construction Industry Regulations' (January 2014 or latest version).
 - 1) 29 CFR 1926.20, 'General Safety And Health Provisions'.
 - 2) 29 CFR 1926.64, 'Hot Work Permit'.
 - 3) 29 CFR 1926.352, 'Fire Prevention'.
 - 4) 29 CFR 1926.500, 'Fall Protection'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Acceleration of Work:
1. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.
 2. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
 - a. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
 - b. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Meet regulations of 29 CFR 1926 OSHA, 'Construction Industry Regulations'.
 2. Owner's Safety Requirements:
 - a. Personal Protection:
 - 1) Contractor shall ensure:
 - a) Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall **6 feet (1.80 m)** or more above a lower level.
 - b) Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.
 - c) Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.
 - b. Contractor Tools And Equipment:
 - 1) Contractor shall ensure:
 - a) Tools and equipment are in good working condition, well maintained, and have necessary guards in place.

- b) Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
 - c) Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
 - d) Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.
- c. Miscellaneous:
- 1) Contractor shall ensure:
 - a) Protection is provided on protruding rebar and other similar objects.
 - b) General Contractor Superintendent has completed the OSHA 10-hour construction outreach training course or equivalent.
 - c) Implementation and administration of safety program on Project.
 - d) Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
 - e) Consistent safety training is provided to employees on Project.
 - f) Implement and coordinate Lockout / Tagout procedures with Owner's Representative as required.
 - 2) Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.
- d. Hot Work Permit:
- 1) Permit shall document that fire prevention and protection requirements in 29 CFR 1926.352, 'Fire Prevention' have been implemented prior to beginning hot work operations.
 - 2) Required for doing hot work involving open flames or producing heat or sparks such as:
 - a) Brazing.
 - b) Cutting.
 - c) Grinding.
 - d) Soldering.
 - e) Thawing pipe.
 - f) Torch applied roofing.
 - g) Welding.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 4000**QUALITY REQUIREMENTS****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 administrative and procedural requirements for quality assurance and quality control.
- B. Related Requirements:
1. Section 01 3100: 'Project Management and Coordination' for Pre-Installation Conferences for testing and inspection.
 2. Section 01 3200: 'Construction Progress Documentation' for developing a schedule of required tests and inspections.
 3. Section 01 3300: 'Submittal Procedures'.
 4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
 5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 6. Section 01 7300: 'Executions' for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
 7. Divisions 01 thru 49 establish responsibility for providing specific testing and inspections.

1.3 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. Approved: To authorize, endorse, validate, confirm, or agree to.
 3. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.
 4. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a construction operation, including installation, erection, application, and similar operations.
 - a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
 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. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
 9. Service Provider: Agency or firm qualified to perform required tests and inspections.
 10. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
 11. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
 12. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
 13. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

B. Reference Standards:

1. International Code Council (IBC) (2015 or most recent edition adopted by AHJ):
 - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Conflicting Requirements:

1. General:
 - a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
 - b. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
2. Minimum Quantity or Quality Levels:
 - a. Quantity or quality level shown or specified shall be minimum provided or performed.
 - b. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
 - c. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.
 - d. Refer uncertainties to Architect for decision before proceeding.

B. Coordination:

1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

C. Scheduling:

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

1.5 QUALITY ASSURANCE

- A. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities and Section 01 4523. Requirements in those Sections may also cover production of standard products.
 2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.

3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- B. Quality Assurance Services:
1. Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
 2. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
- C. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
1. Individual Sections in Division 01 through Division 49:
 - a. Pre-Installation Conference agenda review items for:
 - 1) Schedule requirements.
 - 2) Testing and inspection requirements:
 - 3) Requirements and frequency of testing and inspections.
 - 4) Mock-up or sample requirements.
 - 5) Submittals requirements.
 - b. Quality Assurance personal qualifications.
 - 1) Qualification documentation including certificates if required.
 - c. Non-Conforming Work:
 - 1) Prepare non-compliance log to track non-compliant testing or inspections.
 2. Weekly Activities:
 - a. Summarize and track any non-compliance issues.
 - b. Provide summary report of previous week's performed Work.
 - c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
 - d. Visit Owner's Representatives periodically to find out if they have any concerns with how project is progressing.
- D. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed Work:
1. Coordinate with individual section in Division 01 through Division 49 if there are any additional requirements or modification to these requirements:
 - a. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - b. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - c. Demonstrate proposed range of aesthetic effects and workmanship.
 - d. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 1) Allow seven days for initial review and each re-review of each mockup.
 - e. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
 - 1) Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. Quality Control Services:
1. Quality Control will be sole responsibility of Contractor.
 - a. Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor:
 - 1) They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
 - 2) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.

- b. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
 - 1) Contractor shall not employ same testing entity engaged by Owner, without Owner's written approval.

- B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300: 'Submittal Procedures'.

- C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify Testing Agency sufficiently in advance of operations to permit assignment of personnel. Provide following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist Testing Agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require quality control by Testing Agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections:
 - 1. Civil And Structural Testing:
 - a. 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'. 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) Contractor bears full responsible for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.
 - b. Weekly Activities:
 - 1) Ensure that non-compliance log is current.
 - 2) Provide summary reports of performed Work.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with Contract Document requirements for Section 01 7300 'Execution' for cutting and patching.

- B. Protect construction exposed by or for Quality Assurance and Quality Control activities.

- C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

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 than 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.

AABC	Associated Air Balance Council	Washington	DC	(202) 737-0202	www.aabchq.com
AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5664	www.aamanet.org

AASHTO	American Association of State Highway & Transportation Officials	Washington	DC	(202) 624-5800	www.aashto.org
AAMA	American Architectural Manufacturers Association	Schamamburg	IL	(847) 303-5774	www.aamanet.org
AASHTO	American association of State Highways and Transportation Officials	Washington	DC		www.transportation.org www.aashto.org
ACI	American Concrete Institute International	Farmington Hills	MI	(248) 848-3700	www.aci-int.org
AGA	American Gas Association	Washington	DC	(202) 824-7000	www.aga.org
AHRI	Air Conditioning Heating & Refrigeration Institute	Arlington	VA	(703) 524-8800	www.ari.org
AIA	American Institution of Architects	Washington	DC	(202) 626-7300	www.aia.org
AISC	American Institute of Steel Construction	Chicago	IL	(312) 670-2400	www.aisc.org
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
AMCA	Air Movement & Control Association International	Arlington Heights	IL	(847) 394-0150	www.amca.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
API	American Petroleum Institute	Washington	DC	(202) 682-8000	www.api.org
AQMD	South Coast Air Quality Management District	Diamond Bar	CA	(909) 396-2000	www.aqmd.gov
ASHRAE	American Society of Heating, Refrigerating, & Air-Conditioning Engineers	Atlanta	GA	(404) 636-8400	www.ashrae.org
ASME	American Society of Mechanical Engineers International	New York	NY	(800) 843-2763	www.asme.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
AWS	American Welding Society	Miami	FL	(800) 443-9353	www.aws.org
AWWA	American Water Works Assoc	Denver	CO	(303) 794-7711	www.awwa.org
BHMA	Builders Hardware Manufacturers Association	New York	NY	(212) 297-2122	www.buildershardware.com
BIA	Brick Industry Association	Reston	VA	(703) 620-0010	www.bia.org
CFI	International Certified Floor-covering Installers, Inc.	Kansas City	MO	(816) 231-4646	www.cfi-installers.org
CRI	Carpet & Rug Institution	Dalton	GA	(706) 278-3176	www.carpet-rug.com
CRSI	Concrete Reinforcing Steel Institute	Schaumburg	IL	(847) 517-1200	www.crsi.org
CISPI	Cast Iron Soil Pipe Institute	Chattanooga	TN	(423) 892-0137	www.cispi.org
DHI	Door & Hardware Institute	Chantilly	VA	(703) 222-2010	www.dhi.org
DIPRA	Ductile Iron Pipe Research Association.	Birmingham	AL	(205) 402-8700	www.dipra.org

EIMA	EIFS Industry Members Association	Morrow	GA	(800) 294-3462	www.eima.com
FM	FM Global	Johnston	RI	(401) 275-3000	www.fmglobal.com
FSC	Forest Stewardship Council	Bonn, Germany		+49 (0) 228 367 66 0	www.fsc.org
GA	Gypsum Association	Hyattsville	MD	(301) 277-8686	www.gypsum.org
GS	Green Seal	Washington	DC	(202) 872-6400	www.greenseal.org
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
ISSA	International Slurry Surfacing Association	Annapolis	MD	(410) 267-0023	www.slurry.org
KCMA	Kitchen Cabinet Manufacturers Association	Reston	VA	(703) 264-1690	www.kcma.org
LPI	Lightning Protection Institute	Maryville	MO	(800) 488-6864	www.lightning.org
MFMA	Maple Flooring Manufacturers' Association	Deerfield	IL	(888) 480-9138	www.maplefloor.org
MSS	Manufacturer's Standardization Society of The Valve and Fittings Industry	Vienna	VA	(703) 281-6613	www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers	Glen Ellyn	IL	(630) 942-6591	www.naamm.org
NEC	National Electric Code	(from NFPA).			
NEMA	National Electrical Manufacturer's Association	Rosslyn	VA	(703) 841-3200	www.nema.org
NFPA	National Fire Protection Association	Quincy	MA	(800) 344-3555	www.nfpa.org
NFRC	National Fenestration Rating Council	Greenbelt	MD	(301) 589-1776	www.nfrc.org
NSF	NSF International	Ann Arbor	MI	(734) 769-8010	www.nsf.org
PCA	Portland Cement Association	Skokie	IL	(847) 966-6200	www.cement.org
PCI	Precast / Prestressed Concrete Institute	Chicago	IL	(312) 786-0300	www.pci.org
PEI	Porcelain Enamel Institute	Norcross	GA	(770) 676-9366	www.porcelainenamel.com
RFCI	Resilient Floor Covering Institute	LaGrange	GA	(706) 882-3833	www.rfci.com
SCTE	Society of Cable Telecommunications Engineers	Exton	PA	(800) 542-5040	www.scte.org
SDI	Steel Deck Institute	Fox River Grove	IL	(847) 458-4647	www.sdi.org
SDI	Steel Door Institute	Westlake	OH	(440) 899-0010	www.steeldoor.org
SIGMA	Sealed Insulating Glass Manufacturer's Association	Chicago	IL	(312) 644-6610	www.arcat.com
SJI	Steel Joist Institute	Myrtle Beach	SC	(843) 293-1995	www.steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors National Association	Chantilly	VA	(703) 803-2980	www.smacna.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	www.spib.org
SSMA	Steel Stud Manufacturer's Association	Glen Ellyn	IL	(630) 942-6592	www.ssma.com

TCNA	Tile Council of North America	Anderson	SC	(864) 646-8453	www.tileusa.com
TPI	Truss Plate Institute	Alexandria	VA	(703) 683-1010	www.tpinst.org
TPI	Turfgrass Producers International (formally American Sod Producers Association)	East Dundee	IL	(847) 649-5555	www.turfgrasssod.org
UL	Underwriters Laboratories	Camas	WA	(877) 854-3577	www.ul.com
WDMA	Window and Door Manufacturer's Association	Chicago	IL	(312) 321-6802	www.nwwda.org
WWPA	Western Wood Products Association	Portland	OR	(503) 224-3930	www.wwpa.org

D. Federal Government Agencies:

- 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:

- Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
- 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) Accordion Folding Partitions, Section 10 2233: VMR, no other Manufacturer / Installers accepted.

- b) Aluminum-Framed Entrances And Storefronts, Section 08 4113: VMR, no other Manufacturer / Installers accepted.
 - c) Architectural Woodwork, Section 06 4001: VMR, no other Fabricator accepted except approved Alternate Fabricator.
 - d) Asphalt Shingles, Section 07 3113: VMR, no other Manufacturer / Installers accepted.
 - e) Common Finish Hardware Requirements, Section 08 7101: VMR Supplier, no other Supplier accepted:
 - (1) Accessories, Section 08 7109.
 - (2) Accessories for Pairs of Doors, Section 08 7105.
 - (3) Closing Devices, Section 08 7106.
 - (4) Hanging Devices, Section 08 7102.
 - (5) Operating Trim, Section 08 7104.
 - (6) Protective Plates and Trim, Section 08 7107.
 - (7) Securing Devices, Section 08 7103.
 - (8) Stops and Holders, Section 08 7108.
 - f) Ethylene-Propylene-Diene-Monomer Roofing: EPDM, Section 07 5323: VMR, no other Manufacturer / Installers accepted.
 - g) Flush Wood Doors: Factory Finished, Clear, Section 08 1429: VMR Supplier, no other Supplier accepted.
 - h) Hollow Metal Frames, Section 08 1213: VMR Supplier, no other Supplier accepted.
 - i) Hollow Metal Doors, Section 08 1313: VMR Supplier, no other Supplier accepted.
 - j) Pews, Section 12 6713: VMR, no other Manufacturer / Installers accepted.
 - k) Sheet Carpeting, Section 09 6816: VMR, no other Manufacturer / Installers accepted.
 - l) Tile Carpeting, Section 09 6813: VMR, no other Manufacturer / Installers accepted.
 - m) Wood Athletic Flooring, Section 09 6466: VMR, no other Manufacturer / Installers accepted.
 - n) Wood Framing, Division 06 'Wood', VMR Supplier, no other Supplier accepted for USA Projects Only except approved Supplier:
 - (1) Glue-Laminated Construction, Section 06 1800.
 - (2) Structural Composite Lumber, Section 06 1712.
 - (3) Wood Framing, Section 06 1100.
 - (4) Wood 'I' Joists, Section 06 1733.
 - (5) 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.
 - 3) Following areas of the Work have restrictions on sub-bids by which may be accepted by Contractor:
 - a) Architectural Woodwork, Sections 06 4001: Alternate Fabricator approved by Architect before bidding.
 - b) Audio Systems, Section 27 5117: Alternate Installers approved by Owner before bidding.
 - c) Ceramic Tiling, Section 09 3013: No other Suppliers accepted.
 - d) Electric And Electronic Control System for HVAC, Section 23 0933, No other Distributors accepted.
 - e) Rough Carpentry, Sections 06 1100, 06 1636, 06 1712, 06 1733, and 06 1800: Alternate Supplier approved by Architect before bidding.
 - f) Sound, Division 27: Installers approved by Architect before bidding.
 - g) Video Systems, Section 27 4117: Alternate Installers approved by Owner before bidding.
- c. Acceptable Suppliers / Installers:
- 1) Where heading '*Acceptable Suppliers / Installers / Fabricators*' is used, qualifications as specified in Quality Assurance in Part 1 of individual sections will be used to determine requirements of those that will be acceptable to be used on Project. Lists for

- acceptable installers can include additional installers that may be approved before bidding or by addendum.
- a) Underground Sprinklers, Section 32 8423: Acceptable Landscape Installers approved by Landscape Architect before bidding. Equal Landscape Installers to be approved by Architect before bidding.
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 Consulting Engineers (Engineer of Record).
 - 4) 1 copy to General Contractor.
 - 5) 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) Welding Inspection Procedures (Structural Steel testing).
 - 7) Bolting Inspection Procedures (Structural Steel testing).
 - 8) Shear Connector Stud Inspection Procedures (Structural Steel testing).
 - 9) 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 Consulting Engineer(s) (Engineer of Record).
 - d. 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 5100**TEMPORARY UTILITIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Temporary Utilities.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
 2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
 3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
 4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
 5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
 6. Use qualified personnel for installation and maintenance of temporary facilities. Locate temporary utilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify temporary utilities as required.
 7. Pay cost and use charges for temporary and permanent utilities until Substantial Completion has been granted by Owner.
- B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, change over from use of temporary service to use of permanent service.
- C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload utilities, 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.
- D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.
- E. Maintain temporary utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- F. Remove each temporary utility and control when need has ended, or when replaced by permanent utility, but not later than Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary utilities are property of Contractor.

2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subjected to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

1.3 TEMPORARY ELECTRIC POWER

- A. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

1.4 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard UL Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.
 4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
 5. At earliest feasible date in each area of Project, complete installation of permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

1.5 HEATING, COOLING, AND VENTILATING:

- A. Install and operate temporary heating, cooling, and ventilating units including fuel, temporary piping, fittings, wiring, and connections necessary to provide environmental conditions specified for various portions of the Work. Coordinate ventilation requirements to produce ambient conditions required and reduce consumption of energy.
- B. Repair damage to building and contents caused by cold, heat, dampness, and/or heating, cooling, and ventilating equipment. Select equipment that will not have harmful effect on completed installations or on elements being installed.
- C. Maintain safe conditions for use of temporary heating, cooling, and ventilating systems including, but not limited to, following requirements:
 1. Operate equipment according to equipment manufacturer's instructions.
 2. Provide fresh air ventilation required by equipment manufacturer.
 3. Keep temperature of fuel containers stabilized.
 4. Secure fuel containers from overturning.
 5. Operate equipment away from combustible materials.
- D. Permanent mechanical system may be operated subject to following conditions:
 1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
 2. Operate system at no cost to Owner, including cost of fuel.
 3. Assume all responsibility and risk for operation of system.
 4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

1.6 TEMPORARY LIGHTING

- A. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

1.7 TEMPORARY TELEPHONES

- A. Provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.
- B. Contractor will pay for Local calls. Party making call will pay for long-distance and toll calls.
- C. At each telephone, post list of important telephone numbers.

1.8 TEMPORARY WATER SERVICE

- A. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

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 FIELD OFFICES

- A. Provide and maintain insulated, weather tight temporary office of sufficient size to accommodate Contractor's personnel at Project site and for use by Owner, Architect and Subcontractors.
1. Keep office clean and orderly.
 2. Heat and cool office as needed.
 3. Furnish office with locking door, light(s), table(s), bench(es), rack(s) for drawings, telephone, computer with high speed internet connection and emailing capabilities, printer, and digital camera.
 4. Make office available for progress meetings.
 5. Provide an operable fire extinguisher in facility.
 6. Provide hardhats for Owner's Representatives for site visits.
- B. If Owner agrees to permit removal of temporary office before Substantial Completion, Contractor may use a room as an office after temporary office is removed. Equip room as specified above and restore to 'like-new' condition before Substantial Completion.

1.4 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

SECTION 01 5400
CONSTRUCTION AIDS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC

- A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and elevators as required for proper execution of The Work.
- B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5600**TEMPORARY BARRIERS AND ENCLOSURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.
- B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.
- C. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
1. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
 2. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
 3. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
 4. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
 5. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

1.3 TEMPORARY BARRICADES

- A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.
- B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

1.4 TEMPORARY FENCING

- A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. Locate where shown on Drawings. If not shown on Drawings, enclose entire site or portion sufficient to accommodate construction operations.

1.5 TEMPORARY SECURITY BARRIERS

- A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.
- B. Secure materials and equipment stored on site.
- C. Secure building at the end of each work day.
- D. Maintain exterior building security until Substantial Completion.

1.6 TEMPORARY TREE AND PLANT PROTECTION

- A. Protection:
 - 1. Before commencing site work, build and maintain protective fencing around existing trees and vegetation as shown on the drawings.
 - 2. Individual trees will have protective fencing built beyond drip line.
 - 3. Build protective fencing around groups of trees and other vegetation as indicated on Drawings.
 - 4. Keep areas within protective fencing undisturbed and do not use for any purpose.
- B. Maintenance:
 - 1. Maintain existing tree, shrubs, and vegetation as indicated in Contract Documents:
 - a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5700

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
 - 1. Administrative and procedural requirements for Temporary Controls.

1.2 TEMPORARY EROSION AND SEDIMENT CONTROL

- A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.
- B. Develop, install, and maintain an erosion control plan if required by law.
- C. Repair and correct damage caused by erosion.

1.3 TEMPORARY ENVIRONMENTAL CONTROLS

- A. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
 - 1. Avoid use of tools and equipment that produce harmful noise.
 - 2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.
- B. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage.
- C. Protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water:
 - 1. For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with requirements of applicable local regulations. Where feasible, use permanent facilities.
 - 2. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
- D. Comply with governing ordinances relating to weed control and removal.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5800

PROJECT IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Project Identification.

1.2 TEMPORARY PROJECT SIGNAGE

A. Contractor may, at its option, erect a temporary project identification sign.

1. Sign may be free-standing or attached to temporary field office or storage shed.
2. No other signs or advertisements are allowed on building site.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

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. Refer to individual Specification Sections and Allowance provisions in Division 01 for allowances that control product selection, and for procedures required for processing such selections.

- I. 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.

- J. 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.
- 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 / Installers:
 - 1) Category One:
 - a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - b) 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 National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - b) 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) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
 - 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 6400**OWNER - FURNISHED PRODUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Administrative and procedural requirements for Owner-Furnished Products. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents:
1. Baby Changing Station. See Section 10 2814.
 2. Display Cases. See Section 10 1200.
 3. Fixed Chalkboards. See Section 10 1113.
 4. Fixed Markerboards. See Section 10 1116.
 5. Fixed Tackboards. See Section 10 1123.
 6. Interior Signage. See Section 10 1495.
 7. Network Equipment. See Section 27 1501:
 - a. Internet Firewall.
 - b. ISP Modem.
 - c. Network Switch.
 - d. Wireless Access Port.
 8. Network Streaming Equipment: See Section 27 4117 and Section 27 5117.
 9. Projection Screens. See Section 11 5213.
 11. Serving Area Appliances. See Section 11 3114.
 13. Volleyball Equipment – As specified in Section 11 6625:
 - a. Volleyball floor sleeves (anchors) installed concrete slab by Section 03 3111.
 - b. Volleyball upright (standard) storage unit installed by Section 06 2001.
 - c. Volleyball cover plates and outer rings install by floor installer (Division 09).

1.2 ADMINISTRATIVE REQUIREMENTS

- A. General:
1. Review 'Contractor Notice of Owner Furnished Materials' notice listing Owner-furnished products to be delivered for Project:
 - a. Review due (delivery) dates and vendor lead times for each item and coordinate with construction schedule. Immediately report recommended changes to Owner's Purchasing Coordinator listed in 'Contractor Notice of Owner Furnished Materials'. Contact vendors directly if changes to delivery dates become necessary during construction.
 - b. Report problems in coordinating due (delivery) dates with construction schedule to Architect and Owner's Purchasing Coordinator.
 2. Receive unload, store and protect Owner-furnished materials and products.
 - a. Provide labor and equipment necessary to receive, unload, and store materials and products.
 - b. Count number of pieces received and note any discrepancies on Delivery Receipt before driver leaves:
 - 1) Compare ' Contractor Notice of Owner Furnished Materials' notice' with packing slips.
 - 2) Note discrepancies in number, size, color, model numbers, etc. on Delivery Receipt.
 - c. Include Project Name and Project Number on Delivery Receipt.
 - d. Check for visible evidence of damage such as holes, tears, or crushed portions of cartons and note on Delivery Receipt before driver leaves:
 - 1) Include Project Name and Project Number on Delivery Receipt.
 - 2) If you are unsure if carton is damaged, take photo of cartons and share it with Owner's Purchasing Coordinator.
 - e. Properly store and protect all deliveries of Owner Furnished materials and Products.

3. Within forty-eight (48) hours of delivery:
 - a. Open and inspect each piece of freight delivered. Take picture of any concealed damage not reported at time of delivery and report it to Owner's Purchasing Coordinator.
 - b. Compare 'Contractor Notice of Owner Furnished Materials' with packing slips. Note discrepancies in number, size, color, model numbers, etc.
 - c. Deliver copy of Delivery Receipt (bill of lading) on which you have noted any loss or damage to Owner's Purchasing Coordinator. Include in your submission any report of concealed damage, discrepancies or photos.
4. Failure to strictly follow above procedures will result in your assumption of all financial responsibility for this shipment. All replacement and reorders must be made through Owner's Purchasing Coordinator and must allow Owner's vendor sufficient lead time to produce and ship new product.
5. When above procedures are strictly followed, shortages and damaged items will be replaced by Owner at Owner's cost.

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

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

SECTION 01 7400**CLEANING AND WASTE MANAGEMENT****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. Organ Chamber:
 - 1. Clean debris from inside Organ Chamber and leave dust free before organ speakers are installed.
- G. 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.
- H. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.
- I. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.
- J. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.
- K. 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. Interior Cleaning:
 - a. Clean inside glazing, exercising care not to scratch glass.
 - b. Remove marks, stains, fingerprints and dirt.
 - c. Clean and polish woodwork and finish hardware.
 - d. Remove labels that are not permanent labels.
 - e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
 - f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
 - g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
 - h. Remove temporary floor protection and clean floors.
 - 2. Exterior Cleaning:
 - a. Clean outside glazing, exercising care not to scratch glass.
 - b. Remove marks, stains, and dirt from exterior surfaces.
 - c. Clean and polish finish hardware.
 - d. Remove temporary protection systems.
 - e. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.

- f. Clean drop inlets, through-curb drains, and other drainage structures.
- g. 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.
- B. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
- C. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
 - 1. Punch list of items requiring completion and correction will be created.
 - 2. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

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) Updated AutoCAD as built record drawing files with associated plot style tables or Revit as built record model files, as specified by Owner.
 - 2) 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) Geotechnical Evaluation Reports (soils reports).
 - 5) Manufacture Reports.
 - 6) Manufacturer's literature or cut sheets.
 - 7) Shop Drawings.
 - 8) Source Quality Control.
 - 9) Special Procedures.
 - 10) Testing and Inspection Agency Reports.
 - 11) Testing and Inspection Reports.
7. Project Record Photographs:
 - a. With a digital camera that has a flash and a resolution of at least 8 megapixels, take photographs of the following:
 - 1) All work required to be documented by photographs for the Quality Assessment - Construction Checklist. Refer to Section 01 3100.
 - 2) Site utilities and irrigation system before being buried.
 - 3) All items that are difficult to observe or locate after they are covered up with later stages of construction.
 - 4) All walls and ceilings immediately prior to installing insulation.
 - b. Unless obvious, provide location information in the photographs. Place a small white marker board in the photograph with the room number and orientation (Room 103, west wall).
 - c. Organize and name the digital files with a filing and naming system that will allow easy access to the digital photographs.
 - d. Submit the photographs to the Architect at the Monthly Meetings. Acceptable media types are CDs, DVDs, flash drives, memory cards, emails, or file transfer via an FTP site.
8. Software:
 - a. Audio and Video System software, programming and set-files.
9. Irrigation Plan.
 - a. Laminated and un-laminated reduced sized hard copies.
10. Landscape Management Plan (LMP):
 - a. Irrigation Section:
 - 1) Submittal Format: Digital format and hard copy of each.
 - 2) Documentation required by sections under 32 8000 Heading: 'Irrigation'.

- b. Landscaping Section:
 - 1) Submittal Format: Digital format and hard copy of each.
 - 2) Documentation required by sections under 32 9000 Heading: 'Planting'.

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
230	Elevator, Passenger	Building Equipment
277	Escalator	Building Equipment
231	Wheelchair Lift	Building Equipment
735	Internet Connection Equipment	Computer Equipment
535	Generator, Fixed	Electrical Distribution & Fixtures
1058	UPS System	Electrical Distribution & Fixtures
14	Floor, Carpet	Floors
213	Air Handler, With Coils	HVAC Distribution System
212	Air Handler, Without Coils	HVAC Distribution System
199	Boiler, Hot Water	HVAC Distribution System
200	Boiler, Steam	HVAC Distribution System
456	Boiler, Steam, Power Generating	HVAC Distribution System
215	Chiller, Water	HVAC Distribution System
641	Coils, Evaporator (A Coil)	HVAC Distribution System
214	Condensing Unit	HVAC Distribution System
217	Cooler, Evaporative (Swamp)	HVAC Distribution System
216	Cooling Tower	HVAC Distribution System
622	Dehumidifier System	HVAC Distribution System
209	Fan Coil Unit	HVAC Distribution System
202	Furnace, Duct	HVAC Distribution System
201	Furnace, Forced Air	HVAC Distribution System
208	Heat Pump	HVAC Distribution System
207	Heat Pump, Mini Split, Exterior	HVAC Distribution System
206	Heat Pump, Mini Split, Interior	HVAC Distribution System
205	Heat Pump, Room, Thru Wall	HVAC Distribution System
448	Heater, Radiant Tube	HVAC Distribution System
253	Heater, Wall Mounted, Gas	HVAC Distribution System
621	Humidifier System	HVAC Distribution System
204	HVAC Package Unit (Roof Top)	HVAC Distribution System
1056	Outside Air Tempering Unit	HVAC Distribution System
295	Chemical, Treatment & Filtration System	HVAC Distribution System
1050	Cooling Tower Water Filter	HVAC Distribution System
501	Tank, Motor Fuel, Underground	HVAC Distribution System
497	Tank, Water Storage	HVAC Distribution System
73	Organ Pipe	Musical Instruments
962	Heater, Unit Steam/Hot Water	Plumbing Distribution & Fixtures
988	Water Filter System, Water Main	Plumbing Distribution & Fixtures
779	Backflow Preventer	Plumbing Distribution & Fixtures
138	Tank, Fuel Storage, Above Ground	Plumbing Distribution & Fixtures
137	Tank, Fuel Storage, Underground	Plumbing Distribution & Fixtures
502	Tank, Motor Fuel, Above Ground	Plumbing Distribution & Fixtures
620	Water Cistern and Associated Filtration	Plumbing Distribution & Fixtures
136	Water Well System	Plumbing Distribution & Fixtures

151	Roofing, Asphalt Shingles	Roofing
152-A	Roofing, Metal Shingles: Stone Coated	Roofing
152-B	Roofing, Metal Shingles: Aluminum	Roofing
152-C	Roofing, Metal Shingles: Copper	Roofing
154	Roofing, Concrete Roof Tiles	Roofing
155	Roofing, Standing Seam Sheet Metal	Roofing
156	Roofing, Built Up Asphalt or Bitumen Membrane	Roofing
157-A	Roofing, Single Ply Membrane (EPDM)	Roofing
157-B	Roofing, Single Ply Membrane (PVC)	Roofing
157-C	Roofing, Single Ply Membrane (TPO)	Roofing
158	Roofing, Vegetated Protected Membrane	Roofing
281	Satellite Receiver (IRD)	Sound, Satellite, Security, & Fire Systems
717	Glycol System	Sound, Satellite, Security, & Fire Systems
676	Fire Alarm System, Active	Sound, Satellite, Security, & Fire Systems
1033	Sign, Exit Illuminated Tritium (nuclear)	Sound, Satellite, Security, & Fire Systems

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

SECTION 04 0501**COMMON MASONRY REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Common requirements and procedures for Masonry including:
 - a. References.
 - b. Definitions.
 - c. Pre-Installation Conferences held jointly with masonry sections.
 - d. Joint backing for masonry control joints and masonry expansion joints.
 - e. Testing and Inspection for providing specific testing and inspections and Field Tests and Inspections administrative requirements for masonry.
- B. Related Requirements:
1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 2. Section 01 4523: 'Testing And Inspection Services' for testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods.
 3. Section 07 9213: 'Elastomeric Joint Sealants' used with masonry joints.
 4. Sections Under 04 0000 Heading: 'Masonry':
 - a. Pre-installation conference held jointly with other masonry related sections including:
 - 1) Section 04 0513: 'Cement and Lime Masonry Mortaring'.
 - 2) Section 04 0516: 'Masonry Grouting'.
 - 3) Section 04 0519: 'Masonry Anchors And Inserts'.
 - 4) Section 04 2114: 'Brick Veneer Unit Masonry'.
 - 5) Section 04 2723: 'Cavity Wall Unit Masonry'.

1.2 REFERENCES

- A. Association Publications:
1. The Brick Industry Association, Reston VA: 'Technical Notes on Brick Construction' (July 2012), www.gobrick.com.
- B. Definitions:
1. Brick:
 - a. Cavity Wall Masonry: Wall consisting of two wythes of masonry in which space between wythes is not grouted.
 - b. Hollow Brick: Masonry unit of clay or shale whose net cross-sectional area in any plane parallel to bearing surface is not less than 60 percent of its gross cross-sectional area measured in same plane (See ASTM C652).
 - c. Solid Brick: Solid masonry unit of clay or shale, usually formed into rectangular prism while plastic and burned or fired in a kiln. Solid brick can have core holes whose area is no more than twenty-five 25 percent of total bed surface of the brick.
 - d. Running Bond: Same as common bond, with continuous horizontal joints, but vertical joints are offset or in line. Bricks of each course are offset from the previous instead of being right on top of each other. If running bond is being used with modular brick, end of brick will be at mid-point of brick on course below. Running bond only requires minimal cutting at each end and will easily follow a gentle curve. Running bond method, most used.
 - e. Unit Masonry: as referred to in this specification is defined as Brick Veneer, Hollow Brick, Architectural Concrete, Composite, and Cavity Wall.

- f. Warpage: Distortion of surfaces or edges of an individual brick from a plane surface or from straight line.
 - g. Wythe: Continuous vertical section of masonry one (1) unit in thickness.
2. Brick Classifications:
- a. Brick Color:
 - 1) No color-related tolerances in ASTM standards for brick. Standards are dictated by sample panel, mockups, or project specification.
 - b. Brick Grade (durability and exposure):
 - 1) Brick is subjected to environmental and service conditions that vary. Brick is specified for its specific durability based on severity of weather and exposure and physical properties. Brick grades classifications are based on Weathering Index:
 - a) Grade SW: Severe weathering (stronger and more durable, and require less maintenance).
 - b) Grade MW: Moderate weathering (less durable).
 - c) Grade NW: Negligible or no weathering (least durable and should only be used for interior work).
 - c. Brick Types:
 - 1) Type FBX:
 - a) Brick for general use in masonry where higher degree of precision and lower permissible variation in size than permitted for Type FBS.
 - b) Maintains strict requirements on absorption, waste, chipping, cracks, dimensions and distortion (warpage).
 - c) Allows very narrow color range, minimal size variations, and uniform in appearance.
 - 2) Type FBS:
 - a) Brick for general use in masonry:
 - b) Wider range of color and size variations, but lack of production controls results in many odd color lots.
 - 3) Type FBA:
 - a) Brick for general use in masonry selected to produce characteristic architectural effects resulting from non-uniformity in size and texture of individual units:
 - b) Used for aesthetic qualities.
 - c) Has no limits for size and color variations.
3. 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.
4. Efflorescence: Deposit or encrustation of soluble salts, generally white and most commonly consisting of calcium sulfate that may form on surface of stone, brick, concrete, or mortar when moisture moves through and evaporates on masonry. Often caused by free alkalis leached from mortar, grout, adjacent concrete, or in clays. Test for efflorescence is described in ASTM C67 and CAN/CSA A82.
5. Flashing:
- a. Cavity Wall Flashing: Same as flexible flashing.
 - b. Flashing: Thin impervious material placed in mortar joints and through air spaces in masonry to prevent water penetration and/or provide water drainage.
 - c. Flexible Flashing: Water-proof material typically used in cavity wall construction to contain and assist in proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
 - d. Foundation Flashing: Same as flexible flashing.
 - e. Head And Sill Flashing: Same as flexible flashing.
 - f. Through-Wall Flashing: Generally considered same as flexible flashing.
6. 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 (13 kph)** or greater.
7. Masonry Joints:
- a. Masonry Control Joint: Determines location of movement in concrete masonry walls that is due to volume changes resulting from shrinkage. Vertical control joint is vertical gap through concrete masonry wythe and filled with inelastic materials. Joint backing with sealant is used on exterior side of control joint to prevent water and air penetration. Concrete masonry generally shrinks over time.

- b. Masonry Expansion Joint. Expansion joint separates brick masonry walls into segments to prevent cracking caused by changes in temperature, moisture expansion, elastic deformation, settlement and creep. Joints are formed by leaving continuous unobstructed opening through brick wythe that may be filled with highly compressible material. Joint backing with sealant is used on exterior side of expansion joint to prevent water and air penetration. Brick masonry generally expands over time.
8. Vents:
- a. Weep Hole: Opening placed in mortar joints of facing material at level of flashing, to permit escape of moisture.
 - b. Weep Vent: Inserts placed in Weep Hole to screen insects from entering but allowing escape of moisture.
 - c. Vents (Open Head Joints): Placed at top of drainage air space to help reduce moisture buildup in air space by promoting ventilation. Weep vents may be placed vents to screen insects from entering but allowing movement of air through weep holes.
- C. Reference Standards:
- 1. ASTM International:
 - a. ASTM D2000-12, 'Standard Classification for Rubber Products in Automotive Applications'.
 - b. ASTM D2240-15, 'Standard Test Method for Rubber Property-Durometer Hardness'.
 - c. ASTM D2287-12, 'Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds'.
 - 2. International Building Code (IBC) (2015 or latest approved edition):
 - a. 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'.
 - b. Chapter 21, 'Masonry' for materials, design, construction and quality of masonry.
 - 3. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):
 - a. Building Code Requirements and Specification for Masonry Structures:
 - 1) TMS 402-13/ACI 530-13/ASCE 5-13 'Building Code Requirements for Masonry Structures'.
 - 2) TMS 602-13/ACI 530.1-13/ASCE 6-13, 'Specification for Masonry Structures'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
- 1. Coordinate work with other trades with items to be built into masonry such as electrical switches and plumbing faucets.
- B. 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 conferences:
 - a. Conduct conference at Project site.
 - b. Schedule pre-installation conference during construction of mockup panel.
 - 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review storage and handling requirements.
 - b. Review cold and hot weather procedure requirements.
 - c. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections.
 - 1) Review requirements and frequency of testing and inspections.
 - 2) Review specific testing and inspections and field test requirements as specified in Unit Masonry Sections.
- C. Scheduling:
- 1. Brick Unit Veneer Masonry:

- a. Structural Mortar:
 - 1) Notify Testing Agency and Architect twenty-four (24) hours minimum before placing masonry units, reinforcing, mortar and/or grout.
2. Concrete Unit Masonry:
 - a. Structural Mortar and Grout:
 - 1) Notify Testing Agency and Architect twenty-four (24) hours minimum before placing masonry units, reinforcing, mortar and/or grout.

1.4 SUBMITTALS

- A. Action Submittals:
 1. Product Data: As specified in each masonry section.
 2. Samples: As specified in each masonry section.

1.5 QUALITY ASSURANCE

- A. 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 structural masonry (prisms, units, mortar, and grout):
 - a. Owner will employ testing agencies to perform testing and inspection for structural masonry 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. Scheduling:
 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing mortar.
 2. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing grout.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 1. Check, carefully unload, and deliver material to site in such manner as to avoid soiling, damaging, or chipping.
 2. Do not use damaged masonry units, damaged components of structure, or damaged packaged materials.
 3. Masonry Accessories: Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
 1. Aggregate:
 - a. Store different aggregates separately.
 - b. Store on high ground, or ideally, off ground to prevent contamination from dirt, organic materials and ground water, any of which may contribute to efflorescence and may be deleterious to mortar performance.
 - c. Store under protective cover to avoid saturation and freezing in cold weather.
 2. Cementitious material:
 - a. Store in such manner as to prevent deterioration or intrusion of foreign material or moisture.
 - b. Do not use cementitious materials that have become contaminated.
 - c. Protect from precipitation and groundwater.
 - 1) Store materials on elevated platforms, under cover, and in dry location.
 - 2) Do not use cementitious materials that have become damp or has become unsuitable for good construction.

3. Masonry accessories:
 - a. Store masonry accessories clear of ground, including metal items, to prevent corrosion and contamination by dirt and ground water which may contain soluble salts and other matter which may contribute to efflorescence and staining.
 - b. Plastic and asphalt coated flashing material should not be stored in areas exposed to sunlight. During installation, flashing must be pliable so that no cracks occur at corners or bends.
 - c. Protect from damage until installation.
4. Masonry units:
 - a. Store materials protected from exposure to harmful weather conditions as directed by manufacturer.
 - b. Store material on planks clear of ground which may contain soluble salts and protect from damage, dirt, or disfigurement.
 - c. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof membrane, securely tied. If units become wet, do not install until they are dry.
5. Masonry Reinforcement:
 - a. Protect reinforcement, ties, and metal accessories from permanent distortions, elements and store off ground.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Mortar:
 - a. Ideal mortar temperature is **70 deg F \pm 10 deg F (21 deg C \pm 6 deg C)**. Mixing temperature should be maintained within **10 deg F (6 deg C)**.
 2. Cold Weather Requirements. Implement approved cold weather procedures and comply with requirements contained in TMS 602/ACI 530.1/ASCE 6 including but not limited to following:
 - a. Preparation requirements (prior to conducting masonry work):
 - 1) Do not lay masonry units having either temperature below **20 deg F (minus 7 deg C)** or containing frozen moisture, visible ice, or snow on their surface.
 - 2) Do not use frozen materials or materials mixed or coated with ice or frost. Keep materials free of ice and snow. Do not lay masonry on frozen material. Remove and replace unit masonry damaged by frost or by freezing conditions.
 - 3) Remove visible ice and snow from top surface of existing foundations and masonry to receive new construction. Heat these surfaces above freezing, using methods that do not result in damage.
 - 4) Preparation of mortar.
 - b. Construction requirements (work in progress and based on ambient air temperature):
 - 1) Do not heat water or aggregates used in mortar or grout above **140 deg F (60 deg C)**. Comply with cold weather requirements for ambient air temperatures prior to conducting masonry work in accordance with TMS 402/ACI 530/ASCE 5-11 and TMS 602/ACI 530.1/ASCE 6.
 3. Hot Weather Requirements. Implement approved hot weather procedures and comply with requirements contained in TMS 602/ACI 530.1/ASCE 6 including but limited to following:
 - a. Preparation (prior to conducting masonry work). Comply hot weather procedures when:
 - 1) Ambient air temperature exceeds **100 deg F (37.8 deg C)**, or exceeds **90 deg F (32.2 deg C)** with wind velocity greater than **8 mph (12.9 kph)**.
 - 2) Ambient temperature exceeds **115 deg F (46.1 deg C)**, or exceeds **105 deg F (40.6 deg C)** with wind velocity greater than **8 mph (12.9 kph)**.
 - b. Construction requirements (work in progress). Comply hot weather procedures when prior to conducting masonry work in accordance with TMS 402/ACI 530/ASCE 5-11 and TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MATERIALS - not used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

1. Unit Masonry:
 - a. Tests and Inspections are required as specified in Sections under Heading 04 2000 'Unit Masonry'.
2. Stone Assemblies:
 - a. Inspections are NOT required as specified in Section 04 4300.
3. Cast Stone Masonry:
 - a. Inspections are required as specified in Section 04 7213:

END OF SECTION

SECTION 04 0513**CEMENT AND LIME MASONRY MORTARING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of masonry mortar used on Project.
- 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 04 0501: 'Common Masonry Requirements'.
 - 4. Sections Under 04 2000 Heading: Furnish and install mortar.

1.2 REFERENCES

- A. Definitions:
 - 1. See Section 04 0501: 'Common Masonry Requirements' for common masonry definitions.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar'.
 - b. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
 - c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
 - d. ASTM C270-14a, 'Standard Specification for Mortar for Unit Masonry'.

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: 'Common Masonry Requirements'.

1.4 SUBMITTALS

- A. Informational Submittals:
 - 1. Source Quality Control Submittals:
 - a. If pre-mixed wet mortar or pre-blended dry mortar mix are to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
 - b. If site mixed / blended mortar is to be used, provide written description of proposed method of measuring and mixing of materials.
- B. 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 Inspecting Reports.

1.5 QUALITY ASSURANCE

- A. Testing And Inspection:
 - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
 - 1. Cementitious material:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Design Criteria:
 - 1. Mixing:
 - a. Meet either proportion or property specifications of ASTM C270 for masonry mortar as per Table 3 'Proportion Specifications' and Table 4 'Physical Requirements for Masonry Cement Mortars'.
 - b. Conform with requirements of ASTM C780 and ASTM C1586.
 - c. Machine mixing should be used whenever possible.
 - 2. Mortar Minimum Compressive Strength at twenty-eight (28) days:
 - a. Type N: **750 psi (5 171 kPa)**.
 - 1) Brick Veneer Unit Masonry.
 - 2) Cavity Wall Unit Masonry: Enclosure Walls.
 - b. Type S: **1800 psi (12.4 MPa)**.
 - 1) Cavity Wall Unit Masonry.
 - 2) Concrete Unit Masonry (CMU):
- B. Materials:
 - 1. Portland Cement:
 - a. Meet requirements of ASTM C150/C150M and ASTM C270.
 - 2. Hydrated Lime:
 - a. Meet requirements of ASTM C207 for hydrated lime.
 - 3. Aggregate:
 - a. Meet requirements of ASTM C144 and ASTM C270.
 - 4. Water:
 - a. Clean and free of acids, alkalis, and organic materials.
 - 5. Admixtures:
 - a. Use no admixtures without Architect's written permission. Use of any admixture to meet cold weather requirements and admixtures that increase air entrainment are expressly forbidden under all circumstances.
- C. Mixes:
 - 1. General:
 - a. Heat water and sand to **140 deg F (60 deg C)** maximum if temperature is below **40 deg F (4.4 deg C)**.
 - 2. Unit Masonry for mortar as specified in each Masonry specification section:
 - a. Proportions of ingredients in compliance with proportion specification of ASTM 270 using Portland cement.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

1. Field tests and inspection as specified in 04 0501: 'Common Masonry Requirements'.
2. Sampling and testing of mortar is not required.

END OF SECTION

SECTION 04 0516**MASONRY GROUTING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of masonry grout used on Project.
- 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 04 0501: 'Common Masonry Requirements'.
 - 4. Sections under 04 2000 heading: Furnish and install masonry grout.

1.2 REFERENCES

- A. Definitions:
 - 1. See Section 04 0501 for common masonry definitions.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C143/C143M-15a, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
 - b. ASTM C404-11, 'Standard Specification for Aggregates for Masonry Grout'.
 - c. ASTM C476-16, 'Standard Specification for Grout for Masonry'.
 - d. ASTM C1019-16, 'Standard Test Method for Sampling and Testing Grout'.

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.

1.4 SUBMITTALS

- A. Informational Submittals:
 - 1. Source Quality Control Submittals:
 - a. If pre-blended dry grout is to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
 - b. If grout is to be mixed in field, provide written description of proposed procedure for measuring and mixing of materials.
- B. 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 Inspecting Reports.

1.5 QUALITY ASSURANCE

- A. Testing And Inspection:
 - 1. As specified in Section 04 0501.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 - 1. As specified in Section 04 0501.
- B. Storage And Handling Requirements:
 - 1. Cementitious material:
 - a. As specified in Section 04 0501.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Design Criteria:
 - 1. Provide grout that conforms to requirements of ASTM C476 and TMS 602/ACI 530.1/ASCE 6.
- B. Materials:
 - 1. Proportions of Ingredients:
 - a. Grout proportions shall be determined by one of following methods:
 - 1) As per ASTM C476 Table 1: 'Grout proportions by Volume' for fine and coarse grout.
 - 2) Specified Compressive Strength: Proportions established by twenty-eight (28) day compressive strength tests in accordance with Test Method ASTM C1019 that obtain specified compressive strength:
 - a) Grout shall be mixed to slump of **8 to 11 inches (200 to 280 mm)** as determined by Test Method ASTM C143/C143M and shall have minimum compressive strength of **2000 psi (14 MPa)** at 28 days.
 - 2. Production Methods: Grout shall be produced using one of following procedures:
 - a. Materials mixed at job site:
 - 1) Individual cementitious materials and aggregates stored at job site shall be mixed in mechanical mixer for minimum of five (5) minutes with sufficient water to achieve desired consistency.
 - 2) Individual dry ingredients transported to job site in suitable compartments shall be mixed with water at job site using continuous volumetric proportioning equipment to achieve desired consistency. Mix with auger of appropriate length to provide adequate mixing.
 - b. Mixed materials transported to job site:
 - 1) Factory dry-blended cementitious materials and aggregates delivered to job site shall be mixed in mechanical mixer for minimum of five (5) minutes with sufficient water to achieve desired consistency.
 - 2) Wet-mixed grout shall arrive at job site in ready-mixed condition. Slump shall be adjusted as necessary, and grout shall be re-mixed at mixing speed for at least one minutes before discharging to achieve desired consistency.
 - c. Grout may be hand mixed on small jobs with written approval of mixing procedure by Architect.
- 3. Portland Cement:
 - a. Meet requirements of ASTM C94/C94M, ASTM C150/C150M and ASTM C476.
- 4. Aggregate:
 - a. Meet requirements of ASTM C144, ASTM C404, and ASTM C476.
- 5. Water: Clean and potable free of acids, alkalis, and organic materials.
- 6. Admixtures:

- a. No additives are allowed which will increase air entrainment. Other additives may be used as approved in writing by Architect before use.
- 7. Antifreeze Compounds:
 - a. No antifreeze liquids, salts or other substances shall be used in grout to lower freezing point.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - 1. Field tests and inspection as specified in 04 0501: 'Common Masonry Requirements'.

END OF SECTION

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 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 - 2. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
 - 3. Section 01 4523: 'Testing and Inspecting Services' for post installed Drilled-In Anchor testing and inspection, and testing laboratory services for materials, products, and construction methods.
 - 4. Section 04 0501: 'Common Masonry Requirements' for installation of masonry anchors and inserts.
 - 5. Section 04 0521: 'Masonry Veneer Ties'.
 - 6. Section 04 0523: 'Masonry Accessories'.
 - 7. 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-15, '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) (2015 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 minimum conforming to material requirements of ASTM A36/A36M.
 - b) Anchor hook to project 2 inch minimum including bolt diameter.
 - 2) Headed Bolts:
 - a) Headed type threaded 2 inch 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** 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 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 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 when using fine grout and at least 1/2 inch 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 when using coarse 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.
- 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. Cored 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 Engineer and approved by Architect. Adhesive anchors will not be torque tested unless otherwise directed by Engineer. 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 Engineer.
 - 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

SECTION 04 2223**ARCHITECTURAL CONCRETE UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install architectural concrete unit masonry as described in Contract Documents.
 - 2. Furnish and install anchor bolts and embedded anchors as described in Contract Documents.
 - 3. Grout door frames installed in CMU walls.

- B. Products Installed But Not Furnished Under This Section:
 - 1. Anchor bolts.
 - 2. Door frames.
 - 3. Elastomeric joint sealants.
 - 4. Grout.
 - 5. Metal lintels.
 - 6. Mortar.
 - 7. Reinforcement bars.

- C. Related Requirements:
 - 1. Section 03 2100: 'Reinforcement Bars'.
 - 2. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common masonry requirements and procedures.
 - b. Pre-installation conference held jointly with other masonry related sections.
 - 3. Section 04 0513: 'Cement and Lime Masonry Mortaring' for quality of mortar.
 - 4. Section 04 0516: 'Masonry Grouting' for quality of grout.
 - 5. Section 04 0519: 'Masonry Anchors and Inserts' for anchor bolts used in masonry.
 - 6. Section 05 1223: 'Structural Steel For Buildings' for metal Lintels.
 - 7. Section 07 9213: 'Elastomeric Joint Sealants'.

1.2 REFERENCES

- A. Definitions:
 - 1. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common Masonry Terms.

- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C90-16, 'Standard Specification for Loadbearing Concrete Masonry Units'.
 - b. ASTM C331/C331M-14, 'Standard Specification for Lightweight Aggregates for Concrete Masonry Units'.
 - 2. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):
 - a. TMS 402-13/ACI 530-13/ASCE 5-13 and TMS 602-13/ACI 530.1-13/ASCE 6-13, 'Building Code Requirements and Specification for Masonry Structures'.

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.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. Certificates:
 - a. Prior to construction, certificates for materials used in masonry construction indicating compliance with contract documents are to be submitted. This is "Unit Strength Method" approach.
 2. Source Quality Control Submittals:
 - a. Manufacturer's certification that units meet compressive strength specified requirements.
- B. 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 Testing and Inspecting Reports.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum of five (5) years' experience on successfully completed projects of similar nature.
- B. Testing And Inspection:
 1. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
 1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Cold Weather and Hot Weather Limitations:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Design Criteria:
 1. Minimum Compressive Strength of (2000 psi 13.8 MPa).
- B. Materials:
 1. Mortar: Type 'S' mortar as specified in Section 04 0513: 'Cement and Lime Masonry Mortaring'.

2. Concrete Masonry Units:
 - a. Design Criteria:
 - 1) Meet requirements of ASTM C90, lightweight classification:
 - a) 85 lbs per cu ft (1 362 kg per cu meter) minimum weight classification.
 - b) Lightweight aggregates conforming to ASTM C331/C331M.
 - c) Do not use re-crushed masonry units as aggregate.
 - 2) Outside Corners: Square-edged, except where bull nose is indicated on Contract Drawings.
 - 3) Use special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, etc, as required.
 - 4) Uniform color and textures with unbroken edges. Smooth face, except where shown otherwise on Contract Drawings.

2.2 ACCESSORIES

- A. Construction Cleaning Compounds:
 1. Type Two Acceptable Products:
 - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
 - b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS www.prosoco.com.
 - c. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Verify substrates have been properly prepared.
 2. Verify built-in items are in proper location, and ready for roughing into masonry.
 3. Notify Architect of any unsatisfactory preparation before proceeding.
 - a. Do not install masonry over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

- A. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products specified in other sections.
- B. Prior to placing masonry:
 1. Clean reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
 2. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.
- C. Wetting Masonry Units:
 1. Concrete masonry:
 - a. Do not wet concrete masonry units before laying. Wet cutting is permitted.
- D. Reinforcement:
 1. Place reinforcement and ties in grout spaces prior to grouting.
- E. Provide temporary bracing during installation of masonry work:
 1. Design, provide, and install bracing that will assure stability of masonry during construction.
 2. Maintain bracing in place until building structure provides permanent support.

3.3 INSTALLATION

- A. Interface With Other Work:
1. Masonry Cutting:
 - a. Make cuts proper size to accommodate work of other trades.
 - b. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
 - c. Replace unit masonry in which larger than necessary openings are cut.
 - d. Do not patch openings with mortar or other material.
- B. General:
1. Cold Weather and Hot Weather Limitations:
 - a. Place grout and mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
 2. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
 3. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
 4. Built-In Work:
 - a. As work progresses, install masonry flashings and weep holes and other built-in work specified in other sections.
- C. Tolerances:
1. Masonry work shall be true to vertical and horizontal planes within **1/8 inch (3 mm)** in **10 feet (3 meters)**, non-cumulative.
 2. Maintain **3/8 inch (9.5 mm)** mortar joints throughout.
 3. Grout space or cavity width, except for masonry walls passing framed construction: minus **1/4 inch (6.4 mm)**, plus **3/8 inch (9.5 mm)**.
- D. Mortar:
1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
 2. Do not allow mortar build-up in cavity between brick veneer and Concrete Masonry Units (CMU).
- E. Grouting:
1. General:
 - a. Provide grout that conforms to requirements as specified in Section 04 0516: 'Masonry Grouting'.
 - b. Use fine grout for cavities **2 inches (50 mm)** and smaller in smallest dimension. Use coarse grout for cavities greater than **2 inches (50 mm)** in smallest dimension.
 - c. Grout hollow metal door frames installed in masonry walls solid.
 - d. Provide grout-leveling bed for support of wall plates.
 2. Concrete Masonry Units:
 - a. Fully grout cells containing reinforcing bars.
 - b. Consolidate grout by means of mechanical vibrator. Do not use cell reinforcing to rod grout.
 - c. Before loss of plasticity, mechanically reconsolidate grout.
 3. Placing time:
 - a. Place grout within **1-1/2 inches (38 mm)** introducing water in the mixture and prior to initial set:
 - 1) Discard site-mixed grout that does not meet specified slump without adding water after initial mixing.
 - 2) For ready-mixed grout:
 - a) Addition of water is permitted at time of discharge to adjust slump.
 - b) Discard ready-mixed grout that does not meet specified slump without adding water, other than water that was added at time of discharge.
 - c) Time limitation is waived as long as ready-mixed grout meets specified slump.
 4. Confinement:
 - a. Confine grout to areas indicated on Contract Drawings. Use material to confine grout that permits bond between masonry units and mortar.
 5. Grout Pour Height:
 - a. Place grout in **48 inch (1 200 mm)** maximum lifts.

6. Consolidation:
 - a. Consolidate grout at the time of placement:
 - 1) Consolidate grout at time of placement in height by mechanical vibration or by puddling.
 - 2) Consolidate pours exceeding **12 inch (305 mm)** in height by mechanical vibration, and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
 - b. Consolidation or reconsolidation is not required for self-consolidating grout.
 7. Grout Key:
 - a. When grouting, form grout keys between grout pours. Form grout keys between grout lifts when first lift is permitted to set prior to placement of subsequent lift:
 - 1) Form grout key by terminating grout minimum of **1-1/2 inch (38 mm)** below mortar joint.
 - 2) Do not form grout keys within beams.
 - 3) At beams or lintels laid with closed bottom units, terminate grout pour at bottom of beam or lintel without forming grout key.
- F. Laying:
1. Layout:
 - a. Running bond except where indicated otherwise.
 2. Joints:
 - a. Tool concave. Fill completely except where indicated differently.
 - b. Do not tool until mortar has taken initial set.
 - c. Point holes in joints. Fill and tool properly.
 3. Concrete Masonry Units:
 - a. Lay hollow masonry units dry. Do not lay masonry on frozen material.
 - b. Place hollow units so:
 - 1) Face shells of bed joints are fully mortared.
 - 2) Webs are fully mortared in all courses of piers, columns and pilasters and when necessary to confine grout or insulation.
 - 3) Head joints are mortared, minimum distance from each face equal to face shell thickness of unit.
 - 4) Vertical cells to be grouted are aligned and unobstructed openings for grout are provided in accordance with Contract Drawings.
 - c. Align cells or cavities to preserve unobstructed cavity for grouting:
 - 1) Do not allow excess mortar to block cells.
 - 2) Full bedding required on both webs and face shell under first course. Other courses need only face shell bedding except where bedding is needed to control flow of grout.
- G. Reinforcing:
1. Reinforcing shall be free of material that may destroy bond.
 2. Continuous Joint Reinforcing:
 - a. Beginning approximately **8 inches (200 mm)** from base of masonry, provide joint reinforcing **16 inches (400 mm)** on center vertically, except **8 inches (200 mm)** on center if drip crimped.
 - b. Maximum offset between brick and block coursing is **1-1/4 inch (32 mm)** using ladder adjustable-wire reinforcement or ladder adjustable-wire reinforcement with seismic hook type reinforcing. If brick and block coursing is exactly lined up, ladder adjustable-wire reinforcing may be used. However, such reinforcing may not be bent to fit coursing that does not line up.
 - c. Lap splices and intersections minimum of **6 inches (150 mm)**.
 3. Reinforcing:
 - a. Place steel as shown on Contract Drawings.
 - b. Splice 48 bar diameters minimum.
 - c. Dowel vertical reinforcing bars out of structure below with bars of same size and spacing.

EDIT REQUIRED: Edit or delete following **THREE** paragraphs to fit Project requirements.

- d. Place horizontal bars in **8 inch (200 mm)** deep bond beam units at top of wall and at **48 inches (1 200 mm)** on center between. Continue bond beam units and reinforcement uninterrupted around corners and across wall intersections.

- e. Place special vertical bars of same size as normal vertical reinforcement at corners and jambs of openings and recesses where bond beams are interrupted and at beam bearing locations not otherwise detailed.
 - f. Unless detailed otherwise, place special horizontal bars of same size as normal reinforcing above and below openings. Extend bars **24 inches (600 mm)** minimum beyond opening.
4. Rebar Positioners:
- a. Before grouting, secure masonry reinforcing steel in place with rebar positioners at top of first course and bottom of top course minimum.
 - b. Install intermediary positioners for every 192 bar diameters maximum between positioners.
 - c. Locate intermediary positioners with approximately equidistant spacing in wall when number required has been determined.
- H. Embedded items and accessories:
- 1. Install embedded items and accessories as follows:
 - a. Construct chases as masonry units are laid.
 - b. Install pipes and conduits passing horizontally through masonry partitions.
 - c. Place pipes and conduits passing horizontally through piers, pilasters, or columns.
 - d. Place horizontal pipes and conduits in and parallel to plane of walls.
 - e. Install and secure connectors, flashing, weep holes, weep vents, nailing blocks, and other accessories.
 - f. Install movement (control and expansion) joints.
 - g. Provide control joints as shown on Contract Drawings if included for Project.
 - h. Aluminum:
 - 1) Do not embed aluminum conduits, pipes, and accessories in masonry, grout, or mortar, unless they are effectively coated or isolated to prevent chemical reaction between aluminum and cement or electrolytic action between aluminum and steel.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

- 1. Unit Masonry:
 - a. 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':
 - 1) Quality Control is sole responsibility of Contractor.
 - a) 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.
 - b. Masonry (Masonry Prisms, Masonry Units, Reinforcement, Mortar and Grout):
 - 1) Testing and Inspections shall conform to IBC Section 17 'Special Inspections And Tests' and in accordance with Chapter 3 'Quality And Construction' of TMS 402/ACI 530.1/ASCE 5 (Building Code Requirements for Masonry Structures) and TMS 602/ACI 530.1/ASCE 6 (Specification for Masonry Structures):
 - a) Quality assurance program shall comply with requirements of Chapter 3, for Level A 'Quality Assurance' for Risk Category I, II, or III structures or Level B 'Quality Assurance' for Risk Category IV structures and as defined in ASCE 7 or latest approved adopted building code. See Structural Design Criteria as shown on Contract Documents.

B. Non-Conforming Work:

- 1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

3.5 CLEANING

A. General:

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry.
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

B. Waste Management:

1. Unit Masonry:
 - a. Clean up masonry debris and remove from site.

3.6 PROTECTION

A. General:

1. Brace masonry walls until walls attain adequate strength and are tied into building structure.
2. Do not allow structural loading of masonry walls until walls attain adequate strength.
3. During construction, all walls should be kept dry by covering top of wall with strong, water-resistant membrane at end of each day or shutdown period. Covering should overhang wall by at least **24 inches (610 mm)** on each side, and should be secured against wind.
4. Covering should remain in place until top of cavity wall is completed or protected by adjacent materials.
5. Protect masonry with covering during rainy weather.

B. Cold Weather Requirements:

1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
2. Remove all masonry deemed frozen or damaged.

END OF SECTION

SECTION 04 2723**CAVITY WALL UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install cavity wall unit masonry as described in Contract Documents.
 - 2. Furnish and install anchor bolts as described in Contract Documents.
 - 3. Grout door frames installed in masonry walls.

- B. Products Installed But Not Furnished Under This Section:
 - 1. Masonry Accessories:
 - a. Flexible flashing for brick sills.
 - b. Flexible flashing for bottom of masonry veneer.
 - c. Mortar guard.
 - d. Weep vents.
 - 2. Masonry Veneer Ties.
 - 3. Metal Lintels.

- C. Related Requirements:
 - 1. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common masonry requirements and procedures.
 - b. Pre-installation conference held jointly with other masonry related sections.
 - 2. Section 04 0513: 'Cement and Lime Masonry Mortaring' for quality of mortar.
 - 3. Section 04 0519: 'Masonry Anchors and Inserts' for quality of masonry anchors.
 - 4. Section 04 0521: 'Masonry Veneer Ties' for quality of masonry veneer ties.
 - 5. Section 04 0523: 'Masonry Accessories' for furnishing flexible flashing, mortar guard, and weep vents.
 - 6. Section 05 1223: 'Structural Steel Buildings' for metal lintels.

1.2 REFERENCES

- A. Definitions:
 - 1. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common Masonry Terms.
 - b. Brick Classifications.

- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C90-16, 'Standard Specification for Loadbearing Concrete Masonry Units'.
 - b. ASTM C216-16, 'Standard Specification for Facing Brick (Solid Masonry Made from Clay or Shale)'.
 - c. ASTM C331/C331M-14, 'Standard Specification for Lightweight Aggregates for Concrete Masonry Units'.
 - d. ASTM C476-16, 'Standard Specification for Grout for Masonry'.

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:
 - a. Schedule pre-installation conference during construction of mockup panel.
- B. Scheduling:
 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing masonry units, reinforcing or grout.

1.4 SUBMITTALS

- A. Action Submittals:
 1. Samples:
 - a. One (1) full size brick, one (1) each of special shapes, and physical samples that show range of color and texture of units.
- B. Informational Submittals:
 1. Manufacturer Report:
 - a. Certification that CMU meet specified compressive strength requirements.
- C. Closeout Submittals:
 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturer's documentation:
 - a) Brick Manufacturer's literature or cut sheet.
 - b) Brick color and type selection.
 - 2) Testing and Inspection Reports:
 - a) Testing Agency Testing and Inspecting Reports.

1.5 QUALITY ASSURANCE

- A. Testing And Inspection:
 1. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 1. As specified in 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
 1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Cold Weather and Hot Weather Limitations:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Mortar: Type 'S' as specified in Section 04 0513: 'Cement and Lime Masonry Mortaring'.
2. Concrete Masonry Units (CMU):
 - a. Design Criteria:
 - 1) Meet requirements of ASTM C90, Type I, moisture control units, lightweight classification.
 - a) 85 lbs per cu ft (126 kg per cu meter) minimum weight classification.
 - b) Lightweight aggregates conforming to ASTM C331/C331M.
 - c) Do not use re-crushed masonry units as aggregate.
 - 2) Outside Corners: Square-edged, except where bull nose is indicated on Contract Drawings.
 - 3) Use special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, etc, as required.
 - 4) Uniform textures with unbroken edges.
3. Brick:
 - a. Design Criteria:
 - 1) Meet requirements of ASTM C216, Grade SW, Type FBX.
 - a) Rating for efflorescence shall be 'Not Effloresced'.
 - b) Exposed faces shall be finished and have less than 5 percent chippage and have crack-free appearance when viewed from 15 feet (4.57 m) away.
 - 2) Brick shall be cleanable using standard method specified below when using specified mortar.
 - 3) Brick for Project shall be fired in same run.
 - 4) Match existing in size and texture.
 - 5) Brick shall be paintable.

2.2 ACCESSORIES

A. Cleaning Compounds:

1. Use type of compound recommended by Brick Manufacturer based on minerals present in masonry units.
2. Type Two Acceptable Products:
 - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
 - b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS www.prosoco.com.
 - c. Equal as approved by Architect before use. See Section 01 6200.

B. Reinforcing:

1. Continuous Joint Reinforcing:
 - a. As specified in Section 04 0520: 'Masonry Reinforcing'..

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Verify substrates have been properly prepared.
2. Verify built-in items are in proper location, and ready for roughing into masonry.
3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install masonry over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

- A. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products specified in other sections.
- B. Prior to placing masonry:
 - 1. Clean reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
 - 2. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.
- C. Wetting Masonry Units:
 - 1. Concrete masonry:
 - a. Do not wet concrete masonry units before laying. Wet cutting is permitted.
- D. Reinforcement:
 - 1. Place reinforcement and ties in grout spaces prior to grouting.
- E. Provide temporary bracing during installation of masonry work:
 - 1. Design, provide, and install bracing that will assure stability of masonry during construction.
 - 2. Maintain bracing in place until building structure provides permanent support.

3.3 INSTALLATION

- A. Interface With Other Work:
 - 1. Masonry Cutting:
 - a. Make cuts proper size to accommodate work of other trades.
 - b. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
 - c. Replace unit masonry in which larger than necessary openings are cut.
 - d. Do not patch openings with mortar or other material.
- B. General:
 - 1. Cold Weather and Hot Weather Limitations:
 - a. Place grout and mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
 - 2. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
 - 3. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
 - 4. Built-In Work:
 - a. As work progresses, install masonry flashings and weep holes and other built-in work specified in other sections.
- C. Tolerances:
 - 1. Masonry work shall be true to vertical and horizontal planes within **1/8 inch (3 mm)** in **10 feet (3 meters)**, non-cumulative.
 - 2. Maintain **3/8 inch (9.5 mm)** mortar joints throughout.
 - 3. Grout space or cavity width, except for masonry walls passing framed construction: minus **1/4 inch (6.4 mm)**, plus **3/8 inch (9.5 mm)**.
- D. Mortar:
 - 1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
 - 2. Do not allow mortar build-up in cavity between brick veneer and Concrete Masonry Units (CMU).
- E. Grouting:
 - 1. General:
 - a. Provide grout that conforms to requirements as specified in Section 04 0516: 'Masonry Grouting'.

- b. Use fine grout for cavities **2 inches (50 mm)** and smaller in smallest dimension. Use coarse grout for cavities greater than **2 inches (50 mm)** in smallest dimension.
 - c. Concrete masonry units (CMU) cells:
 - 1) Fully grout cells containing reinforcing bars.
 - 2) Consolidate grout by means of mechanical vibrator. Do not use cell reinforcing to rod grout.
 - 3) Before loss of plasticity, mechanically reconsolidate grout.
 - d. Grout hollow metal door frames installed in masonry walls solid.
 - e. Provide grout-leveling bed for support of wall plates.
2. Placing time:
 - a. Place grout within **1-1/2 inches (38 mm)** introducing water in the mixture and prior to initial set:
 - 1) Discard site-mixed grout that does not meet specified slump without adding water after initial mixing.
 - 2) For ready-mixed grout:
 - a) Addition of water is permitted at time of discharge to adjust slump.
 - b) Discard ready-mixed grout that does not meet specified slump without adding water, other than water that was added at time of discharge.
 - c) Time limitation is waived as long as the ready- mixed grout meets the specified slump.
 3. Confinement:
 - a. Confine grout to areas indicated on Contract Drawings. Use material to confine grout that permits bond between masonry units and mortar.
 4. Grout pour height:
 - a. Do not exceed maximum grout pour height given in TMS 602/ACI 530.1/ASCE 6 Table 7 'Grout space requirements'.
 - 1) Fine and coarse grouts are defined in ASTM C476.
 5. Grout lift height:
 - a. Place grout in **48 inch (1 200 mm)** maximum lifts.
 6. Consolidation:
 - a. Consolidate grout at the time of placement:
 - 1) Consolidate grout at time of placement in height by mechanical vibration or by puddling.
 - 2) Consolidate pours exceeding **12 inch (305 mm)** in height by mechanical vibration, and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
 - b. Consolidation or reconsolidation is not required for self-consolidating grout.
 7. Grout Key:
 - a. When grouting, form grout keys between grout pours. Form grout keys between grout lifts when first lift is permitted to set prior to placement of subsequent lift:
 - 1) Form grout key by terminating grout minimum of **1-1/2 inch (38 mm)** below mortar joint.
 - 2) Do not form grout keys within beams.
 - 3) At beams or lintels laid with closed bottom units, terminate grout pour at bottom of beam or lintel without forming grout key.
- F. Laying:
1. Layout:
 - a. Running bond except where indicated otherwise.
 - b. Select brick so there is uniform distribution of hues.
 - c. Use solid brick where brick coursing would otherwise show cores.
 2. Joints:
 - a. Tool concave. Fill completely except where indicated differently.
 - b. Do not tool until mortar has taken initial set.
 - c. Point holes in joints. Fill and tool properly.
 3. Concrete Masonry Units:
 - a. Lay hollow masonry units dry. Do not lay masonry on frozen material.
 - b. Place hollow units so.
 - 1) Face shells of bed joints are fully mortared.
 - 2) Webs are fully mortared in all courses of piers, columns and pilasters and when necessary to confine gout or insulation.

- 3) Head joints are mortared, minimum distance from each face equal to face shell thickness of unit.
- 4) Vertical cells to be grouted are aligned and unobstructed openings for grout are provided in accordance with Contract Drawings.
- c. Align cells or cavities to preserve unobstructed cavity for grouting.
4. Brick Masonry Units:
 - a. Wet each brick to saturation. Lay brick when surface is dry. Brick absorption when laid should not exceed **0.025 oz per sq in (1.1 kg per sq m)** maximum.
 - b. Shove brick into place in full mortar bed, do not lay.
 - c. Completely fill horizontal and vertical joints. Do not furrow bed joints.
 - d. Strike backside joints on brick flush. Do not allow mortar build-up in cavity between brick veneer and Concrete Masonry Units (CMU).
- G. Reinforcing:
 1. Reinforcing shall be free of material that may destroy bond.
 2. Continuous Joint Reinforcing:
 - a. Beginning approximately **8 inches (200 mm)** from base of masonry, provide joint reinforcing **16 inches (400 mm)** on center vertically, except **8 inches (200 mm)** on center if drip crimped.
 - b. Maximum offset between brick and block coursing is **1-1/4 inch (32 mm)** using ladder adjustable-wire reinforcement or ladder adjustable-wire reinforcement with seismic hook type reinforcing. If brick and block coursing is exactly lined up, ladder adjustable-wire reinforcing may be used. However, such reinforcing may not be bent to fit coursing that does not line up.
 - c. Lap splices and intersections minimum of **6 inches (150 mm)**.
 3. Masonry Reinforcing Steel:
 - a. Place steel as shown on Contract Drawings.
 - b. Splice 48 bar diameters minimum.
 - c. Place reinforcing and dowels before pouring grout.
 - d. Dowel vertical reinforcing bars out of structure below with bars of same size and spacing.
 - e. Place horizontal bars in **8 inch (200 mm)** deep bond beam units at top of wall and at **48 inches (1 200 mm)** on center between. Continue bond beam units and reinforcement uninterrupted around corners and across wall intersections.
 - f. Place special vertical bars of same size as normal vertical reinforcement at corners and jambs of openings and recesses where bond beams are interrupted and at beam bearing locations not otherwise detailed.
 - g. Unless detailed otherwise, place special horizontal bars of same size as normal reinforcing above and below openings. Extend bars **24 inches (600 mm)** minimum beyond opening.
 4. Rebar Positioners: Before grouting, secure masonry reinforcing steel in place with rebar positioners at top of first course and bottom of top course minimum. Install intermediary positioners for every 192 bar diameters maximum between positioners. Locate intermediary positioners with approximately equidistant spacing in wall when number required has been determined
- H. Mortar Guard:
 1. Bottom masonry course at foundation:
 - a. Place mortar guard continuously between brick (or CMU) and sheathing.
 2. Above windows and doors:
 - a. Place mortar guard continuously between brick (or CMU) and sheathing.
- I. Embedded items and accessories:
 1. Install embedded items and accessories as follows:
 - a. Construct chases as masonry units are laid.
 - b. Install pipes and conduits passing horizontally through masonry partitions.
 - c. Place pipes and conduits passing horizontally through piers, pilasters, or columns.
 - d. Place horizontal pipes and conduits in and parallel to plane of walls.
 - e. Install and secure connectors, flashing, weep holes, weep vents, nailing blocks, and other accessories.
 - f. Install movement (control and expansion) joints.
 - g. Provide control joints as shown on Contract Drawings if included for Project.
 - h. Aluminum:

- 1) Do not embed aluminum conduits, pipes, and accessories in masonry, grout, or mortar, unless they are effectively coated or isolated to prevent chemical reaction between aluminum and cement or electrolytic action between aluminum and steel.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

1. Unit Masonry:

- a. 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':
 - 1) Quality Control is sole responsibility of Contractor.
 - a) 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.
- b. Masonry (Masonry Prisms, Masonry Units, Reinforcement, Mortar and Grout):
 - 1) Testing and Inspections shall conform to IBC Section 17 'Special Inspections And Tests' and in accordance with Chapter 3 'Quality And Construction' of TMS 402/ACI 530.1/ASCE 5 (Building Code Requirements for Masonry Structures) and TMS 602/ACI 530.1/ASCE 6 (Specification for Masonry Structures):
 - a) Quality assurance program shall comply with requirements of Chapter 3, for Level A 'Quality Assurance' for Risk Category I, II, or III structures or Level B 'Quality Assurance' for Risk Category IV structures and as defined in ASCE 7 or latest approved adopted building code. See Structural Design Criteria as shown on Contract Documents.

B. Non-Conforming Work:

1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

3.5 CLEANING

A. General:

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry.
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

B. Waste Management:

1. Unit Masonry:
 - a. Clean up masonry debris and remove from site.

3.6 PROTECTION

A. General:

1. Brace masonry walls until walls attain adequate strength and are tied into building structure.
2. Do not allow structural loading of masonry walls until walls attain adequate strength.
3. During construction, all walls should be kept dry by covering top of wall with strong, water-resistant membrane at end of each day or shutdown period. Covering should overhang wall by at least 24 inches (610 mm) on each side, and should be secured against wind.

4. Covering should remain in place until top of cavity wall is completed or protected by adjacent materials.
 5. Protect masonry with covering during rainy weather.
- B. Cold Weather Requirements:
1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
 2. Remove all masonry deemed frozen or damaged.
- C. Stain prevention: Prevent grout, mortar, and soil from staining face of masonry to be left exposed. Immediately remove mortar and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with pointed and integral finishes, from mortar droppings.
 4. Turn scaffold boards near wall on edge at end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

END OF SECTION

SECTION 05 1200**STRUCTURAL STEEL FRAMING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install structural steel framing as part of building structure as described in Contract Documents.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Structural anchors, plates, channels, angles, etc, to be cast into concrete.
- C. Related Requirements:
 - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation of structural items to be cast into concrete.
 - 2. Sections under 04 2000 heading: Installation of structural items to be embedded in masonry.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Institute of Steel Construction:
 - a. AISC 'Guide to Design Criteria for Bolted and Riveted Joints' (2nd Edition).
 - b. AISC 'Steel Construction Manual' (14th Edition).
- B. Reference Standards:
 - 1. American Concrete Institute:
 - a. ACI 318-14, 'Building Code Requirements for Structural Concrete' (ACI 318) and 'Commentary on Building Code Requirements for Structural Concrete' (ACI 318R).
 - b. ACI 318M-14, 'Building Code Requirements for Structural Concrete (ACI 318M) and Commentary' (ACI 319RM).
 - 2. American Institute of Steel Construction / The Society for Protective Coatings:
 - a. AISC 420-10/SSPC-QP 3, 'Certification Standard for Shop Application of Complex Protective Coating Systems'.
 - 3. American National Standards Institute / American Institute of Steel Construction:
 - a. ANSI/AISC 340-14, 'Specification for Structural Joints using High-Strength Bolts'.
 - b. ANSI/AISC 341-10, 'Seismic Provisions for Structural Steel Buildings'.
 - c. ANSI/AISC 358-10, 'Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications'.
 - d. ANSI/AISC 360-10, 'Specification for Structural Steel Buildings'.
 - 4. American National Standards Institute / American Society for Nondestructive Testing (Following are specifically referenced for Structural Steel testing):
 - a. ANSI/ASNT CP-189-2011, 'Standard for Qualification and Certification of Nondestructive Testing Personnel'.
 - b. ANSI/ASNT SNT-TC-1A-2011, 'Personnel Qualification and Certification in Nondestructive Testing'.
 - 5. 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'.
 - b. ANSI/AWS D1.3/D1.3M:2008, 'Structural Welding Code - Sheet Steel'.
 - c. ANSI/AWS D1.4/D1.4M:2011, 'Structural Welding Code - Reinforced Steel'.
 - 6. American Welding Society:
 - a. AWS QC1:2007, 'Standard for AWS Certification of Welding Inspectors'.

7. ASTM International:
 - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel.'
 - b. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.'
 - c. ASTM A435/A435M-90(2012), 'Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates'.
 - d. ASTM A500/A500M-13, 'Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.'
 - e. ASTM A992/A992M-11(2015), 'Standard Specification for Structural Steel Shapes.'
 - f. ASTM F3125/F3125M-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'.
8. International Code Council (IBC) (2015 or latest approved edition):
 - a. IBC Chapter 17, 'Special Inspections and Tests'.

1.3 SUBMITTALS

- A. Action Submittals:
 1. Product Data:
 - a. Submit product data and samples, if requested by Architect.
 2. Shop Drawings:
 - a. Shop drawings and calculations, shall include, but not be limited to, plans, elevations, and large scale details of typical sections, connections, joining, and accessories.
 - b. Show other fabricated work.
- B. Informational Submittals:

1.4 QUALITY ASSURANCE

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Deliver material to job site at such intervals as to insure uninterrupted progress of Work.
 2. Deliver anchor bolts, bearing plates and other items to be set by other Contractors shall be delivered to site in ample time for installation and with templates and/or setting instructions.
- B. Storage and Handling Requirements:
 1. Structural steel shall not be handled until paint has thoroughly dried. Care must be exercised to avoid abrasions and other damage.
 2. Material shall be stocked out of mud and dirt and proper drainage shall be provided. Structural steel must be protected from damage or soiling by adjacent construction operations.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Materials:
 1. Angles, Channels, and Miscellaneous steel parts of steel framing systems.
 - a. Meet requirements of ASTM A36/A36M.
 - b. S, HP, C, or TEE shapes in horizontal or vertical application, together with angles, plates, etc, as shown on Drawings.
 2. Columns, Beams 'W' shapes: Meet requirements of ASTM A992/A992M without supplementary requirements.
 3. Structural Pipe:

- a. Meet requirements of ASTM A53/A53M, Type E or S, Grade B.
 - 1) Weight Class, STD, Schedule 40.
 - 2) Weight Class, XS, Schedule 80.
 4. Structural Tubing: Meet requirements of ASTM A500/A500M, Grade B.
- B. Fabrication:
1. Requirements: Structural metal shall be product of domestic mill.
 2. ANSI/AISC 360 shall serve as minimum standard.
 3. Fabricate items to be embedded in concrete or masonry according to approved details of work to be connected.
- C. Finishes: Shop prime structural steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
1. Do not begin structural steel framing erection until structural support components have been installed and are in suitable condition to receive framing.

3.2 ERECTION

- A. Special Techniques:
1. Standards:
 - a. AISC's 'Specification for Structural Steel Buildings' and 'Code of Standard Practice for Steel Buildings and Bridges' shall serve as minimum standards. Erection includes setting, aligning, and bracing as necessary.
 2. Do not overload or exceed carrying capacity of any structural steel element during construction period.
 3. Bridging installation shall proceed concurrently with truss erection and be completed before trusses are subjected to construction loads.
 - a. Do not remove bridging after construction is complete.
 4. Plates or Channels Embedded in Concrete:
 - a. Tack weld bolts to plates or channels to prevent bolts from turning when nuts are tightened.
 5. Immediately after erection, clean completed field connections and damaged surfaces with solvents and hand or power tools. After cleaning, apply corrosion-resistant primer compatible with factory-applied primer.
- B. Interface with Other Work:
1. Furnish items to be embedded in concrete or masonry to Division 03 or 04 respectively in time to be securely tied in place before placing concrete and grout.

3.3 FIELD QUALITY CONTROL

- A. Field Tests and Inspections:
1. General Requirements:
 - a. Furnish items to be embedded in concrete or masonry to Division 03 or 04 respectively in time to be securely tied in place before placing concrete and grout.
 2. Structural Steel - General:
 - a. Inspection during fabrication is not required if fabricator is registered and approved to perform such work without inspection. Field testing and field inspection of steel is not required.

END OF SECTION

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 D3498-03(2011), 'Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems'.
 - c. ASTM F1667-17, '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
8d Box	2-1/2 inches	0.113 inch
8d Common	2-1/2 inches	0.131 inch
10d Box	3 inches	0.128 inch
10d Common	3 inches	0.148 inch
16d Box	3-1/2 inches	0.135 inch
16d Sinker	3-1/4 inches	0.148 inch
16d Common	3-1/2 inches	0.162 inch

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

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. Glue-laminated structural units.
 - 2. Miscellaneous structural steel elements.
 - 3. Roof related blocking, wood nailers, and curbs.
 - 4. Structural composite lumber.
 - 5. 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. Section 06 1800: 'Glued-Laminated Construction'.
 - 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) Operable partition headers.
 - 2) Rough opening.
 - 3) Shear walls and struts.
 - 4) Nails and nailing requirements.
 - 5) Truss installation.
 - 6) Connections.
 - 2. Participate in pre-installation conference held jointly with Section 08 4113.
 - a. 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.
 - 2. Qualification Statements:
 - a. Alternate Supplier(s):
 - 1) Provide name and contact information.
 - 2) Provide Qualification documentation as requested.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Suppliers:
 - a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.

1.6 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 MATERIALS

- A. 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** 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: 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 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).
- B. Posts, Beams, And Timbers 5 Inches by 5 Inches and Larger:
 - 1. Design Criteria:
 - a. No. 1 or better Douglas Fir or Southern Pine.
- C. Lumber Ledgers:
 - 1. Design Criteria:
 - a. No. 2 Douglas Fir-Larch, or Southern Pine.

- D. See Contract Drawings for additional requirements.

2.2 ACCESSORIES

- A. Accordion Folding Partition Headers:
 - 1. See specification requirements of Section 06 1636 and as shown on Contract Drawings.
- B. Blocking:
 - 1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch.
- C. Furring Strips:
 - 1. Utility or better.
- D. Sill Sealer:
 - 1. Closed-cell polyethylene foam, 1/4 inch thick by width of plate.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Approved Installers. See Section 01 4301.
 - 1. Approved framers are to be included by addendum five days prior to the pre-installation conference.
- B. Installers shall be pre-approved and included in Contract Documents by Addendum.

3.2 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.
 - 1) .
- 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.
- C. Tolerances:
 - 1. Walls:
 - a. 1/4 inch in 20 feet non-cumulative in length of wall.
 - b. 1/8 inch in 10 feet with 1/4 inch maximum in height of wall.
 - c. Distances between parallel walls shall be 1/4 inch maximum along length and height of wall.
- D. Floors:
 - 1. Place with crown side up.
 - 2. Provide accurately fitted header and trimmer joists of same size as regular joists around floor openings, unless detailed otherwise, and support by steel joist hangers.
 - 3. Double joists under partitions that parallel run of joists.
- E. Walls:
 - 1. Openings: Single, bearing stud supporting header and one adjacent (king) stud continuous between top and bottom plates, unless shown otherwise.

2. Corners and Partition Intersections: Triple studs.
3. Top Plates In Bearing Partitions: Doubled or tripled and lapped. Stagger joints at least 48 inches.
4. Firestops:
 - a. Horizontal or vertical concealed spaces in walls, light coves, soffits, drop ceilings, and other features over 10 feet in length or height, and at stairs, ceiling levels, floor levels, and other junctures of horizontal to vertical concealed spaces.
 - b. Within concealed spaces of exterior wall finishes and exterior architectural elements, such as trims, cornices or projections, at maximum intervals of 20 feet, length or height.
5. Sill Plates:
 - a. Shear Walls and Bearing Walls:
 - 1) Provide specified anchor 12 inches maximum and 4 inches minimum from each end of each plate.
 - 2) Shear Walls: Fasten with anchor bolts embedded in concrete or with screw anchors.
 - 3) Bearing Walls: Fasten with anchor bolts embedded in concrete, or with screw anchors or expansion bolts in drilled holes.
 - b. Non-Structural Walls: Fasten with powder actuated fasteners.
 - c. In addition to requirements of paragraphs 'a' and 'b' above, set sill plates of interior walls measuring less than 36 inches in length in solid bed of specified construction adhesive, except where sill sealer is used.
 - d. Install specified seal sealer under sill plates of exterior walls of main building and of acoustically insulated interior walls.
 - e. Masonry Wall Plates:
 - 1) Anchor 2x6 and 2x8 wall plates to top of block walls with 5/8 inch diameter anchor bolts at 32 inches on center unless noted otherwise.
 - 2) Set plates on masonry bearing walls true and level to provide full bearing. Use mortar as specified in Division 04 for leveling if leveling is required.
6. Posts and Columns:
 - a. Unless shown otherwise, nail members of multiple member columns together with 16d at 6 inches on center from each side.
7. 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 on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches 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 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.
8. Nailing:
 - a. Stud to plate (coordinate with Contract Drawings):

2 by 4 inch nominal	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	End nail, five 16d OR toe nail, six 8d
1-3/4 by 5-1/2 inch LVL	End nail, three 16d OR toe nail, four 8d
1-3/4 by 7-1/4 inch LVL	End nail, four 16d OR toe nail, six 8d
1-3/4 by 9-1/4 inch LVL	End nail, five 16d OR toe nail, six 8d
1-3/4 by 11-1/4 inch LVL	End nail, six 16d OR toe nail eight 8d

- b. Top plates: Spiked together, 16d, 16 inches on center.

- c. Top plates: Laps, lap members 48 inches minimum and nail with 16d nails 4 inches on center
 - d. Top plates: Intersections, three 16d.
 - e. Backing and Blocking: Three 8d, each end.
 - f. Corner studs and angles: 16d, 16 inches on center.
- F. Roof and Ceiling Framing:
1. Place with crown side up at 16 inches 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 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 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 Wood Trusses:
 - a. Provide continuous 2x4 horizontal web bracing as shown on project drawings.
 - 1) Secure bracing to each truss with two 10d or 16d nails.
 - 2) Lap splice bracing by placing bracing members side by side on common web member. Butt splices are not acceptable.
 - b. Unless directed or shown otherwise, provide diagonal 2x4 bracing between trusses at each line of horizontal web bracing.
 - 1) This diagonal bracing shall be continuous and extend from junction of web and top chord of one truss to junction of web and bottom chord of different truss.
 - 2) Install bracing at approximately 45 degree angle. Bracing will extend over three trusses minimum or more as determined by height of trusses and 45 degree installation angle.
 - 3) Install brace on side of web opposite horizontal web bracing and nail to each web with two 10d or 16d nails.
 - 4) Install one brace every 20 feet as measured from top of brace to top of next brace.
 5. Installation of Glue-Laminated Structural Units:
 - a. Install work in accordance with Fabricators instructions and Glue-Lam Erection Safety Practices.
 - b. Adequately support and brace work until tied into building structure to insure against collapse due to wind or other forces.
 - c. Maintain protection of beams until roofing has been installed.
 6. 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.
- G. 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.
- H. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers) for Metal Framing:
1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
 2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.
- I. Furring Strips:
1. On Wood or Steel: Nail or screw as required to secure firmly.
 - a. Ceiling:
 - 1) Attach furring strips to the underside of structural elements with #8 wood screws, of length to penetrate wood framing 1 inch minimum.

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 06 1100: 'Wood Framing' for:
 - a. Pre-installation conference held jointly with Section 06 1636.
 - 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. International Code Council (IBC) (2015 or latest AHJ approved edition):
 - a. IBC Chapter 17, 'Special Inspections And Tests'.

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. Informational Submittals:
 - 1. Qualification Statements:
 - a. Alternate Supplier(s):
 - 1) Provide name and contact information.
 - 2) Provide Qualification documentation as requested.
- B. 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. Qualifications:
 - 1. Suppliers:
 - a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.
 - b. VMR Approved Supplier(s):
 - 1) Approval subject to VMR agreement process approval.
 - c. Alternate Supplier(s):
 - 1) Fabricator Firm specializing in performing work of this section:
 - a) Firm experience in supplying products indicated for this Project.
 - b) Financial stability.
 - c) Sufficient production capacity to produce required units.
 - d) Comply with specifications and Contract Documents.
 - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
 - 2) Submit documentation to Architect or Owner.
- B. 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 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. 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 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

2.2 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. Wall Sheathing:**1. Spacing:**

- a. Provide 1/8 inch space between sheets at end and edge joints.

2. Edge Bearing And Blocking:

- a. Panel edges shall bear on framing members and butt along their center lines.
- b. Back block panel edges, which do not bear on framing members, with 2 inch nominal framing.

3. Nail Spacing:

- a. As indicated on Contract Drawings.
- b. Place nails not less than 3/8 inch in from edge.

4. Thickness:
 - a. As indicated on Contract Drawings.
 5. Do not install any piece of wall sheathing with shortest dimension of less than 12 inches.
- C. 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 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 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 unless support is provided under all edges.
- D. Floor Sheathing:
1. Floor Sheathing: 1 Layer Subflooring (floors accessible to public).
 - a. Apply bead of glue to structural supports. Lay face grain / strength axis across supports and with panel continuous over two supports minimum.
 - b. Allow expansion gap of at least 1/8 inch at walls.
 - c. Tongue and Groove.
 - d. Nail Spacing.
 - 1) As indicated on Contract Drawings.
 - e. Thickness:
 - 1) As indicated on Contract Drawings.
 - f. Do not install any piece of bottom layer floor sheathing with shortest dimension of less than 24 inches.
 2. Subflooring: 2 Layers Subflooring.
 - a. Bottom layer:
 - 1) Glue subflooring layers together along lines of structural supports.
 - 2) Leave 1/32 inch gap at side and end joints.
 - 3) Nail as per floor sheathing nailing requirements.
 - 4) Thickness:
 - a) 19/32 inch actual minimum thickness, except where specifically noted otherwise.
 - 5) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches.
 - b. Top layer:
 - 1) Stagger joints of second layer subflooring so they do not line up with joints of first layer subflooring, but do align with intermediate structural member (for example, align with field nailing of bottom subflooring layer).
 - 2) Glue subflooring layers together along lines of structural supports.
 - 3) Leave 1/32 inch gap at side and end joints.
 - 4) Nail at 6 inch centers on ends and 12 inch centers on intermediate structural members.
 - 5) Thickness:
 - a) 19/32 inch actual minimum thickness, except where specifically noted otherwise.
 - 6) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches.

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 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, 'Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior Exposure Conditions'.
 - b. ASTM D5456-17, '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. 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.
- B. 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.
- C. Materials:
1. 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.
 2. Adhesive: Meet requirements of ASTM D2559.
- D. 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

SECTION 06 2024**DOOR, FRAME, AND FINISH HARDWARE INSTALLATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install sealants for caulking door frames as described in Contract Documents.
 - 2. Furnish and install insulation in doorframes as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Flush wood doors.
 - 2. Finish hardware.
- C. Related Requirements:
 - 1. Sections under 04 2000 heading: Grouting of frames installed in masonry walls.
 - 2. Section 08 1416: 'Flush Wood Doors'.
 - 3. Section 07 2116: 'Blanket Insulation' for quality of fiberglass insulation.
 - 4. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants.
 - 5. Sections under 08 1000 heading: Furnishing of doors.
 - 6. Sections under 08 7000 heading: Furnishing of finish hardware.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference.
 - 1. Participate in pre-installation conference.
 - 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Schedule conference after hardware has been delivered to site and organized into hardware groups by door, but before installation of hardware.
 - b. Check for appropriate blocking and for correct hardware models and fasteners for substrates.
 - c. Review submittals and set of Manufacturer's installation, adjustment, and maintenance instructions submitted under Section 08 7101.
 - d. Review use of crowbar or other prying devices are not permitted to be used to set door frame into wall opening.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Installer Report:
 - a. Report verifying correct operation and adjustment of installed hardware.
 - 2. Special Procedure Submittals:
 - a. Copy of 'Installation Guide for Doors & Hardware' by Door & Hardware Institute. Guide may be obtained from Door and Hardware Institute (DHI).

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Wood Doors:
 - a. Do not have doors delivered to building site until after plaster, cement, and taping compound are dry.

- b. If doors are to be stored at job-site for more than one week, seal top and bottom edges if not factory sealed.
- B. Storage And Handling Requirements:
1. Wood Doors:
 - a. Store flat on a level surface in a dry, well ventilated building.
 - 1) Cover to keep clean but allow air circulation
 - b. Handle with clean gloves and do not drag doors across one another or across other surfaces.
 - c. Do not subject doors to abnormal heat, dryness, or humidity or sudden changes therein
 - 1) Condition doors to average prevailing humidity of locality before hanging.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Wood Frames:
1. Site Tolerances:
 - a. Squareness: **1/16 inch (1.6 mm)** from top edge to opposite top edge.
 - b. Plumbness: **1/16 inch (1.6 mm)** from top of jamb to bottom of jamb.
 - c. Alignment: **1/16 inch (1.6 mm)** from plane of left side face of jamb to right side face of jamb.
 - d. Twist: **1/16 inch (1.6 mm)** across throat of jamb plane measured across each face to plane of opposite jamb throat.
 - e. Finished Clearance Between Door And Frame:
 - 1) **1/16 inch (1.6 mm)** at head and hinge jamb plus **1/16 inch (1.6 mm)** maximum
 - 2) **1/8 inch (3 mm)** at strike jamb plus or minus **1/16 inch (1.6 mm)** maximum.
 - 3) **1/2 inch (12.7 mm)** to top of finished floor surface or **1/4 inch (6 mm)** to top of threshold, plus or minus **1/16 inch (1.6 mm)** maximum.
 2. Set frame in location and level head.
 - a. Use of crowbar or other prying device to set door frame into wall opening will damage door frames and are not permitted to be used.
 3. Equalize with adjustable floor anchor.
 4. Set spreaders and fasten jambs to floor and wall.
 - a. Wood spreaders shall be square, fabricated from lumber one inch minimum thick, be same length as door opening at header, and same depth as frame.
 - b. Cut notches for frame stops.
 - c. Do not remove spreaders until frames are permanently anchored in wall.
 - d. Use one spreader at base of frame and another at strike level.
 - e. Do not use temporary spreaders welded to base of jambs during installation of frame.
 5. Fill gap between frame and framing with urethane foam or tightly-packed fiberglass insulation. If urethane foam is used, foam interior of frames before installing frame. Trim excess before installation of frame.
 6. Caulking:
 - a. Caulk around both sides of frames of doors receiving acoustical seals with specified sealant.
 - b. Caulk around both sides of frames installed in exposed masonry walls with specified sealant.
- B. Doors:
1. When Project is completed, doors shall not bind, stick, or be mounted so as to cause future hardware difficulties.
 2. Do not impair utility or structural strength of door in fitting of door, applying hardware, or cutting and altering door louvers, panels, or other special details.
- C. Hardware:
1. General:

- a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
 - b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.
2. Hardware for Wood Doors:
- a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
 - b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
 - c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
1. Arrange to have keys brought to Project site and, in meeting attended by local representatives and Architect, test every new key and locking mechanism.
- 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.
 2. Door frames:
 - a. Door frames damaged by use of crowbar or other prying devices to set door frames shall be repaired or replaced at no additional cost to Owner.

3.3 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
1. Using Owner's Operations And Maintenance Manual, explain keying systems at same time keys and locking mechanisms are tested.

END OF SECTION

SECTION 06 2210**MISCELLANEOUS WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wood trim not specified elsewhere as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of Wood Trim.
 - 3. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - 4. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 5. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - 2. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide **8 inch by 10 inch (200 mm by 255 mm)** sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 - 1. Source Quality Control Submittals:
 - a. Samples:

- 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample for finish.

1.4 WARRANTY

- A. Manufacturer Extended Warranty:
 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Design Criteria:
 1. General:
 - a. Meet requirements of Section 06 4001 for general standards for materials and fabrication of Architectural Woodwork.
 2. Clear Finished Hardwood:
 - a. Match materials specified in Section 06 4512.
 - b. Match finish specified in Section 06 4512 and match Owner selected sample as specified in Section 09 9324.

2.2 SOURCE QUALITY CONTROL

- A. Inspections:
 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 4001**COMMON ARCHITECTURAL WOODWORK REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
- B. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for furring and blocking.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.
 - 3. Section 06 2210: 'Miscellaneous Wood Trim'.
 - 4. Section 06 4005: 'Plastic Laminate'.
 - 5. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
 - 6. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 7. Section 09 9324: 'Interior Clear-Finished Hardwood' for filling of nail holes and finishing.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature for specialty items and hardware not manufactured by Architectural Woodwork fabricator.
 - 2. Shop Drawings:
 - a. Approved VMR Fabricator:
 - 1) Fabricator First Submittal:
 - a) Provide 1/4 inch (or larger) scale building layout and/or description of required room walls required for field dimension for Field Quality Control Submittal. Provide submittal before rough framing is completed.
 - 2) Fabricator Second Submittal:
 - a) Provide shop drawings for cabinet and casework that are included for project showing details, casework locations and layout and required dimensions based on Field Quality Control Submittals for compliance to Contract Drawings for approval to Project Architect.
- B. Informational Submittals:

1. Field Quality Control Submittals:
 - a. Contractor First Submittal:
 - 1) Provide verification field dimensions and updated Contract Drawings of all areas requested from Fabricator First Submittal from Approved VMR Fabricator including but limited to the following:
 - a) Field dimensions (finish wall dimensions) of all walls with casework.
 - 2) Submit First Submittal to VMR Fabricator within three (3) days of completion of gypsum board installation but before gypsum board finishing to allow VMR Fabricator necessary time to complete casework.
 - b. Second Submittal:
 - 1) Provide verification field dimensions and updated Contract Drawings after Rostrum floor framing and gypsum board is installed in Rostrum area as requested from First Submittal from Approved VMR Fabricator including the following:
 - a) Field dimensions (finish wall dimensions) of all walls in rostrum area if included on project.
 - b) Field dimensions of rostrum floor framing.
2. Qualification Statement:
 - a. Fabricator:
 - 1) VMR Approved Fabricators:
 - a) Provide Qualification documentation as part of VMR agreement process.
 - 2) Alternate Fabricator:
 - a) Provide name and contact information.
 - b) Provide Qualification documentation as requested.

1.4 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
 1. Fabricator:
 - a. VMR Approved Fabricators:
 - 1) Approval subject to VMR agreement process approval.
 - b. Alternate Fabricator(s):
 - 1) Fabricator Firm specializing in performing work of this section:
 - a) Minimum five (5) years experience in Woodwork installations.
 - b) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and installation procedures required for this project before.
 - c) Firm experience in supplying products indicated for this Project.
 - d) Financial stability.
 - e) Sufficient production capacity to produce required units.
 - f) Comply with specifications and Contract Documents.
 - g) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
 - 2) Submit documentation to Architect or Owner.

1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 1. Fabricator Responsibility:
 - a. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
 - b. Protect architectural woodwork from moisture and damage while in transit to job site.
 2. General Contractor Responsibility:
 - a. Report damaged materials received within two (2) days from delivery at project site.
- B. Storage And Handling Requirements:
 1. General Contractor Responsibility:

- a. Unload and store in place where it will be protected from moisture and damage and convenient to use.

1.6 WARRANTY

- A. Manufacturer Extended Warranty:
 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 FABRICATORS

- A. Approved Fabricators. See Section 01 4301 for Qualification Requirements.
 1. Category One VMR Approved Fabricators. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements.
 - a. Anderson Cabinet and Millwork, 198 North 4700 East, Rigby, ID 83442.
 - 1) Contact Information: Matt Miller phone (208) 538-7415 cell (208) 317-7412 e-mail matt@andersoncabinet.net.
 - b. Michael Seiter & Co., Inc., P.O. Box 315 Heber City, UT 84032.
 - 1) Contact Information: Mark Seiter phone (435) 654-0601 fax (435) 654-0613 e-mail mark@msandcoinc.com.
 - c. Thompson and Sons Cabinets, 11834 N. 3400 West, Deweyville, UT 84309.
 - 1) Contact Information: David Thompson cell (435) 230-0876 office (435) 257-7152 e-mail zcabinets@comcast.net.
 2. Same Approved Fabricator shall furnish following Specification Sections:
 - a. Section 06 2210: 'Miscellaneous Wood Trim'.
 - b. Section 06 4005: 'Plastic Laminate'.
 - c. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
 - d. Section 06 4512: 'Architectural Woodwork Wood Trim'.

2.2 ASSEMBLIES

- A. Design Criteria:
 1. General:
 - a. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for materials, construction, and installation of architectural woodwork.
 2. Materials:
 - a. Lumber:
 - 1) Grade:
 - a) No defects in boards smaller than 600 sq in (3 871 sq cm).
 - b) One defect per additional 150 sq inches (968 sq cm) in larger boards.
 - c) Select pieces for uniformity of grain and color on exposed faces and edges.
 - d) No mineral grains accepted.
 - 2) Allowable Defects:
 - a) Tight knots not exceeding 1/8 inch (3 mm) in diameter. No loose knots permitted.
 - b) Patches (dutchmen) not apparent after finishing when viewed beyond 18 inches (450 mm).
 - c) Checks or splits not exceeding 1/32 inch by 3 inches (1 mm by 75 mm) and not visible after finishing when viewed beyond 18 inches (450 mm).
 - d) Stains, pitch pockets, streaks, worm holes, and other defects not mentioned are not permitted.
 - e) Normal grain variations, such as cats eye, bird's eye, burl, curl, and cross grain are not considered defects.

- 3) Use maximum lengths possible, but not required to exceed **10 feet (3 meters)** without joints. No joints shall occur closer than **72 inches (1 800 mm)** in straight runs exceeding **18 feet (3 600 mm)**. Runs between **18 feet (3 600 mm)** and **10 feet (3 meters)** may have no more than one joint. No joints shall occur within **72 inches (1 800 mm)** of outside corners nor within **18 inches (450 mm)** of inside corners.
- 4) Moisture content shall be six (6) percent maximum at fabrication. No opening of joints due to shrinkage is acceptable.

B. Fabrication:

1. Follow Architectural Woodwork Standards (AWS) for fabrication of Architectural Woodwork.
2. Tolerances:
 - a. No planer marks (KCPI) allowed. Sand wood members and surfaces with 100 grit or finer.
 - b. Maximum Gap: None allowed.
 - c. Flushness Variation: **0.015 inch (0.4 mm)** maximum.
 - d. Sanding Cross Scratches: **1/4 inch (6 mm)** maximum.
 - e. Plug screw holes. Screw locations not to be visible beyond **18 inches (450 mm)**.
3. Fabricate work in accordance with measurements taken on job site.
4. 'Ease' sharp corners and edges of exposed members to promote finishing and protect users from splinters. Radius of 'easing' shall be uniform throughout Project and between **1/32 and 1/16 of an inch (0.8 and 1.6 of a millimeter)**.
5. Fabricate so veneer grain is vertical.
6. Joints:
 - a. Use lumber pieces with similar grain pattern when joining end to end.
 - b. Compatibility of grain and color from lumber to panel products is required.
7. Install hardware in accordance with Manufacturer's directions. Leave operating hardware operating smoothly and quietly.
8. Remove or repair damaged surface of or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 4005**PLASTIC LAMINATE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Wall-hung counters.
 - 2. Countertops for custom casework.
- B. Related Requirements:
 - 1. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of wall-hung counters.
 - b. Installation of countertops for custom casework.
 - 2. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - 3. Sections Under 22 4200 Heading: Plumbing Fixtures.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
 - 1. Flame Spread: The propagation of flame over a surface.
 - a. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
 - 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Premium Grade: Highest Grade available in both material and workmanship where highest level of quality, materials, workmanship, and installation is required.
 - 3. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
 - 4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
- C. Reference Standards:
 - 1. ASTM International:
 - a. ASTM E84-18, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - b. ASTM E162-15a, 'Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source'.
 - 2. Kitchen Cabinet Manufacturers Association:
 - a. ASTM/KCMA A161.1-2012, 'Performance And Construction Standards For Kitchen And Vanity Cabinets'.
 - 3. National Electrical Manufacturer's Association / American National Standards Institute:
 - a. ANSI/NEMA LD-3-2005, 'High Pressure Decorative Laminates'.
 - 4. Underwriters Laboratories, Inc.:
 - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (10th Edition).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Color selections.
 - b. Manufacturer's technical data sheet.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Provide Manufacturer's certification of compliance to ANSI/NEMA LD 3.
 - 2. Test And Evaluation Reports:
 - a. Test reports: Certified test reports showing compliance with specified performance characteristics and physical properties for Quality Assurance if requested by Owner or Architect.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature for plastic laminate.
 - b) Color selections.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire-Test-Response Characteristics: Provide plastic laminate with surface burning characteristics as determined by testing identical products by qualified testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Plastic Laminate shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.

1.5 WARRANTY

- A. Manufacturer Extended Warranty:
 - 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fabricators:
 - 1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.
- B. Manufacturers:
 - 1. Type Two Acceptable Manufacturers:
 - a. Formica, Cincinnati, OH www.formica.com or Formica Canada Inc, St Jean sur Richelieu, PQ (450) 347-7541, all matte finish.
 - b. Nevamar, Odenton, MD www.nevamar.com.
 - c. Pionite Decorative Surfaces, Auburn, ME www.pionite.com.
 - d. WilsonArt, Temple, TX www.wilsonart.com or WilsonArt International Inc, Mississauga, ON (905) 565-1255.
 - e. Equal as approved by Architect before bidding. See Section 01 6200.

- C. Plastic Laminates:
 - 1. Design Criteria:
 - a. Countertops:
 - 1) Post-formed front edge and backsplash, except where detailed otherwise, with plastic laminate meeting requirements of ANSI/NEMA LD 3: PF 42.
 - a) Vertical Applications: GP 28.
 - b) Horizontal (other than countertops): GP 38.
 - 2) No raised lip on front edge.
 - b. Balancing Material: BK 20.
 - c. AWS Quality Grade: Premium.
 - 2. Assemblies:
 - a. Countertops shall meet requirements of KCMA A161.1.
 - b. Adhesives for other than post-formed types shall be spray grade, high heat resistant, neoprene contact adhesive.
 - 3. Colors:
 - a. As selected by the Architect.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 4114**WOOD-VENEER-FACED ARCHITECTURAL CABINETS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
1. Custom casework.
- B. Related Requirements:
1. Section 06 1100: 'Wood Framing' for wall blocking required for Custom Casework.
 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of Custom casework.
 3. Section 06 4001: 'Common Architectural Woodwork Requirements' for:
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
 4. Section 09 9324: 'Interior Clear-Finished Hardwood' for wood finishes.
 5. Sections Under 22 4200 Heading: Plumbing Fixtures.

1.2 REFERENCES

- A. Association Publications:
1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
 - b. HPVA, NWWDA, or APA.
 2. Hardwood Plywood & Veneer Association (HPVA), Reston, VA www.hpva@hpva.org.
 3. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.
 4. Window & Door Manufacturers Association (WDMA) Chicago, IL www.wdma@wdma.com.
- B. Definitions:
1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
 2. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
 3. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 4. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
 5. Medium Density Fiberboard (MDF): Generic name for a panel or core manufactured from lignocellulosic fibers combined with synthetic resin or other suitable binder and bonded together under heat and pressure in hot press by process in which added binder creates entire bond.
 6. Panel Product: Panels manufactured with differences in core materials, adhesives or binders which affect characteristics of the panels. These include wood veneers and many prefinished wood panels and decorative overlays with aesthetic and performance characteristics.
 7. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.

8. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
9. Veneer: A thin sheet or layer of wood, usually rotary cut, sliced or sawn from a log or flitch. Thickness may vary from 1/100 inch (0.3 mm) to 1/4 inch (6.4 mm).

C. Reference Standards:

1. American National Standards Institute / Builders Hardware Manufacturers Association:
 - a. ANSI/BHMA A156.11-2014, 'Cabinet Locks'.
2. American National Standards Institute / Hardwood Plywood & Veneer Association:
 - a. ANSI/HPVA HP-1-2009, 'Standard for Hardwood and Decorative Plywood'.
3. American National Standards Institute / Window & Door Manufacturers Association (WDMA):
 - a. ANSI/WDMA I.S. 6A-13, 'Industry Standard for Architectural Stile and Rails Doors'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the efforts of the various trades affected by the Work of this Section.
2. Coordinate completion of 2x6 (50mm x 100mm) wall blocking for custom casework.
3. Coordinate completion of custom casework.

1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Manufacturer's literature or cut sheets for hardware.
2. Shop Drawings:
 - a. Confirm compliance with Contract Document requirements as to configuration and dimensions of custom casework.
 - b. Include plan and elevation views, materials used, standing and running trim profiles, assembly methods, joint details, fastening methods, accessories, and hardware.
3. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample(s) of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample for finish.

1.5 WARRANTY

A. Manufacturer Extended Warranty:

1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS**2.1 ASSEMBLIES****A. Components:****1. Design Criteria:****a. General:**

- 1) Except as noted otherwise, fabricate the work of this section according to AWS 'Custom Grade'.
 - a) Cabinet door wood grain direction shall run vertically and all doors shall be set matched.
 - b) Cabinet drawer front wood grain direction may run vertically or horizontally, with same direction maintained on all cabinet or elevation of cabinets.
- 2) Casework Construction Type:
 - a) Type B: Face-frame construction where front edge of cabinet body components are overlaid with frame.
- 3) Door interface style:
 - a) Type B Construction: Flush Overlay.

b. Solid Stock:

- 1) Exposed: Plain sawn Red Oak.
- 2) Semi-exposed And Concealed: Species as acceptable for AWS 'Custom Grade'.

c. Panel Product:

- 1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
- 2) Moisture content shall be same as specified for lumber.
- 3) Cores:
 - a) Cabinet Doors: Medium density fiberboard (MDF) with minimum density of **48 lbs per cu ft (769 kg per cu meter)**.
 - b) All Other: Industrial grade particle board with minimum density of **45 lbs per cu ft (721 kg per cu meter)**.
- 4) Facings:
 - a) Hardwood veneer facings shall be plain sliced Red Oak AWS Grade A, or equal by HPVA, WDMA, or APA.
 - b) All other facings shall be Melamine or Kortron.
- 5) Edgings:
 - a) Cabinet Doors And Drawer Fronts Higher Than **8 Inches (200 mm)**:
 - (1) **3/4 inch by 1/8 to 1/4 inch (19 mm by 3 to 6 mm)** edge-banding of wood species matching hardwood face veneer.
 - b) Shelves And Exposed Panel Product Edges:
 - (1) Hot-glued, 3 mm thick, PVC edge-banding. Wood-grain, except color matching Melamine or Kortron surface at all four shelf edges.
 - c) Semi-Exposed Panel Product Edges:
 - (1) Hot-glued, 3 mm thick, wood grained PVC edge-banding.

d. Casework Doors:

- 1) Face Veneer:
 - a) Design Criteria:
 - (1) Plain sliced Red Oak meeting requirements of AWS Grade A, **1/50 inch (0.5 mm)** thick minimum immediately before finishing.
 - (2) Face veneers shall be running book matched.
- 2) Doors under **1-3/8 inch (35 mm)** thick: Panel Product.

B. Fabrication:**1. Cabinet Body:**

- a. Use AWS Flush Overlay construction on cabinet bodies.
- b. If used, install Rail System adjustable shelf supports recessed.

2. Drawers:

- a. Fabricate with separate, screw-attached drawer front.
- b. Joints shall be dowel and pressure-glued, or lock shoulder, glued, and pin nailed.

- c. Set bottoms into sides, backs, and subfront with **1/4 inch (6 mm)** deep groove with **3/8 inch (9.5 mm)** minimum standing shoulder.
- d. Every drawer shall have specified drawer guides and pull installed. Install drawer guides with 'Euroscrows', and pulls with through-bolts passing through both front and sub-front.
- 3. Cabinet Doors:
 - a. Full height, panel product cabinet doors may be fabricated in two pieces and joined on back with metal backplate. Backplate shall match interior door surface color.
 - b. Hinges: Install hinges using plastic insertion dowels for hinges and 'Euroscrows' for baseplates.
 - c. Every cabinet door shall have specified pull installed.
- 4. Cabinet Component Thickness And Material:
 - a. Use hardwood veneer facing on panel product, except on following surfaces:
 - 1) Where Kortron or Melamine shall be used.
 - 2) Cabinet exposed interiors surfaces (not including cabinet doors) and shelving faces behind cabinet doors in all rooms.
 - 3) Cabinet semi-exposed surfaces.
 - 4) Cabinet concealed surfaces.
 - 5) Cabinet exposed exteriors permanently concealed (not exposed to view).
 - 6) Drawer sides, backs, bottoms, and subfronts.
 - b. Ends, Divisions, Bottoms, Tops: **3/4 inch (19 mm)** thick panel product.
 - c. Rails: **3/4 inch (19 mm)** thick panel product.
 - d. Shelves:
 - 1) Panel product.
 - 2) Thickness:
 - a) **30 Inch (750 mm)** Span And Less: **3/4 inch (19 mm)** thick.
 - b) Spans Over **30 Inches (750 mm)** To **42 Inches (1 050 mm)**: **One inch (25 mm)** thick.
 - c) Spans Over **42 inches (1 050 mm)**: **One inch (25 mm)** thick and provide Hafele or equal center supports.
 - e. Backs: **1/4 inch (6 mm)** thick panel product.
 - f. Doors: **3/4 inch (19 mm)** thick panel product.
 - g. Drawer Sides, Backs, And Subfronts: **1/2 inch (12.7 mm)** thick minimum panel product.
 - h. Drawer Bottoms: **1/4 inch (6 mm)** thick panel product.
 - i. Separate Drawer Front:
 - 1) **8 Inches (200 mm)** High And Less: **3/4 inch (19 mm)** thick solid hardwood.
 - 2) More Than **8 Inches (200 mm)** High: **3/4 inch (19 mm)** panel product.
 - j. Hardboard Dividers: **1/4 inch (6 mm)** thick panel product.
 - k. Hardboard Shelves: **1/8 inch (3 mm)** thick hardboard, smooth both sides.
- 5. Cabinet and Drawer Locks:
 - a. Install only on cabinets and drawers as shown on Contract Documents.
- 6. Install plastic grommets in cable access holes in countertops located as located on Contract Documents.

C. Finishes:

- 1. Factory Finishing:
 - a. Design Criteria:
 - 1) Applied before leaving factory.
 - 2) Factory-finish to match Owner selected sample as specified in Section 09 9324.
 - b. Color:
 - 1) Match existing wood stain color. Match samples shall be selected by the Architect.

2.2 ASSESSORIES

A. Manufacturers:

- 1. Manufacturer Contact List for Assessories:
 - a. Accuride, Santa Fe Springs, CA www accuride.com.
 - b. Anybumper, Amite, LA www Anybumper.com.
 - c. Blum Inc, Stanley, NC www blum.com.
 - d. CompX National, Mauldin, SC www nclnet.com.

- e. Grass America Inc, Kernerville, NC www.grassusa.com.
 - f. Hafele America Co., Archdale, NC hafele.com.
 - g. Ives, Indianapolis, IN www.iveshardware.com.
 - h. Knappe & Vogt, Grand Rapids, MI www.knappeandvogt.com or Knappe & Vogt Canada, Mississauga, ON (905) 676-8972.
 - i. Olympus Lock Co, Seattle, WA www.olympus-lock.com.
 - j. Salice America Inc, Charlotte, NC www.saliceamerica.com.
 - k. Stanley, New Britain, CT www.stanleyhardware.com.
- B. Cabinet Hardware:
1. Cabinet And Drawer Pulls:
 - a. Satin Chromium Plated brass / bronze core bow handles, 4 inches (100 mm) long minimum.
 - b. Type Two Acceptable Products:
 - 1) 4484 by Stanley.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.
 2. Cabinet And Drawer Locks:
 - a. General:
 - 1) Pin tumbler type suitable for location.
 - 2) Keying: Key each cabinet and drawer individually as shown on Contract Documents except as follows:
 - a) Key each cabinet and drawer within each Office alike.
 - b) Crosskey knife drawer in Serving Area so all other cabinet and drawer keys will open drawer.
 - 3) Stamp keys with Room number and cabinet designation as shown on Signage Plan of Contract Drawings.
 - 4) Provide six (6) keys per cabinet.
 - 5) Provide six (6) master keys that will open all cabinet locks in the project.
 - b. Design Criteria:
 - 1) Barrel diameter: 7/8 inch (22 mm).
 - 2) Cylinder length: 7/8 inch (22 mm).
 - 3) Key removable in locked or unlocked position.
 - 4) Meet ANSI/BHMA A156.11 Grade 2 requirements.
 - c. Type Two Acceptable Manufacturers:
 - 1) Advantage Plus cam lock by CompX National Lock.
 - 2) 100DR/200DW N Series door and drawer lock by Olympus Lock Inc.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.
 3. Cabinet Adjustable Shelf Supports:
 - a. Either of following systems are acceptable, at Fabricator's option:
 - 1) 32mm System: Casework Fabricator's standard.
 - 2) Traditional System:
 - a) Class Two Quality Standards: 255 and 256 by Knappe & Vogt.
 4. Cabinet Hinges:
 - a. Description:
 - 1) Cup Hinge (Concealed Hinge or European style).
 - 2) Steel, nickel-plated, full overlay, self closing with dowel, Mod 17.
 - b. Design Criteria:
 - 1) Doors 48 inches (1 200 mm) High or Less:
 - a) Two (2) hinges.
 - b) Hinge Opening: 165 degree minimum.
 - 2) Doors over 48 inches (1 200 mm) High:
 - a) Four (4) hinges.
 - b) Hinge Opening: 165 degree minimum.
 - c. Basis of Design: Model 329.03.558 with Model 329.73.510 mounting plate by Hafele.
 - 1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Blum.
 - b) Grass America.
 - c) Hafele.
 - d) Knappe & Vogt.
 - e) Salice.

5. Cabinet Inactive Leaf Catches:
 - a. Class Two Quality Standards:
 - 1) Full-Height Doors: Two Surface Bolts No 043 - 2 inch (50 mm) by Ives.
 - 2) All Other Doors: Elbow Catch No 2 by Ives.
6. Drawer Guides:
 - a. Keyboard / Pencil Drawers:
 - 1) Steel ball bearings, 45 lb (20 kg) load rating minimum.
 - 2) 3/4 extension, top mounting.
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Series 2006 by Accuride.
 - b) Article 422.14.345 by Haffele.
 - c) Series KV8200 by Knape & Vogt.
 - b. Standard Drawers:
 - 1) Full extension, steel ball bearings, 100 lb (45 kg) load rating.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Series 3832-Classic by Accuride.
 - b) Article 422.04.552 by Haffele.
 - c) Series KV8400 by Knape & Vogt.
 - c. Lateral Files / Serving Area Drawers:
 - 1) Files/Drawers 30 inches (762 mm) wide and under:
 - a) Full extension, steel ball bearings, 150 lb (68 kg) load rating.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Series 4034 by Accuride.
 - (2) Article 422.17.550 by Haffele.
 - (3) Series KV8505 by Knape & Vogt.
 - 2) Files/Drawers over 30 inches (762 mm) wide:
 - a) Duty, full extension, steel ball bearings, 200 lbs (90 kg) load rating.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Series 3640-A by Accuride.
 - (2) Article 422.07.554 by Haffele.
 - (3) Series KV8800 by Knape & Vogt.
- C. Cabinet Door Bumpers:
 1. Description:
 - a. Polyurethane bumper to protect gypsum board from cabinet handle damage where cabinet handles hit gypsum wallboard surface.
 2. Design Criteria:
 - a. Clear.
 - b. Peel adhesion.
 - c. Size: 3/8 inch (9.5 mm diameter x 1/8 inch (3 mm) thick.
 3. Type Two Acceptable Products:
 - a. WS-34 Cylindrical Soft Durometer Cabinet Bumper by Anybumper.
 - b. Equal as approved by Architect before installation. See Section 01 6200.

2.3 SOURCE QUALITY CONTROL

- A. Inspections:
 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 4512**ARCHITECTURAL WOODWORK WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Accordion folding partition hardwood jambs and trim.
 - 2. Casings, stops, handrails, and jambs.
 - 3. Chair rails.
 - 4. Fixed shelving not part of casework.
 - 5. Hardwood trim at light coves, speaker cabinets, etc,
 - 6. Hardwood base.
 - 7. Hardwood trim for wall covering.
 - 8. Wood trim at ceiling trim.

- B. Related Requirements:
 - 1. Section 05 5215: Stainless steel used in Rostrum Riser Handrail and Rostrum Ramp Handrail.
 - 2. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
 - 3. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of Wood Trim.
 - 4. Section 06 2210: Remaining Wood Trim.
 - 5. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - 6. Section 08 1429: Interior Flush Wood Doors.
 - 7. Section 09 9324: 'Interior Clear-Finished Hardwood'.
 - 8. Section 10 2233: 'Accordion Folding Partitions'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - 2. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
 - 3. Running Trim: Generally combined in the term "standing and running trim" and refers to random, longer length trims delivered to the jobsite (e.g., baseboard, chair rail, crown molding).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Include materials used, standing and running trim profiles, joint details, and hardware.

2. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample for finish.

1.4 WARRANTY

- A. Manufacturer Extended Warranty:
 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.
- B. Performance / Design Criteria: Conform to requirements of Section 06 4001 'Common Architectural Woodwork Requirements'.
 1. Glue: Waterproof and of best quality.
 2. Factory-finish to match Owner selected sample as specified in Section 09 9324.
- C. Architectural Woodwork Wood Trim:
 1. Interior Hardwood For Transparent Finish:
 - a. Design Criteria:
 - 1) Solid wood shall be plain sawn Red Oak.
 - 2) Paneling shall be panel product with plain sliced Red Oak veneer.
 - 3) Finish to match Owner selected sample as specified in Section 09 9324.
 - b. Color:
 - 1) Match existing wood stain color. Samples for matching shall be selected by the Architect.
 2. Interior Wood For Opaque, Painted Finish:
 - a. Applies to ceiling trim only.
 - b. Solid wood shall be any species allowed by AWS Custom grade.
- D. Shelves:
 1. Conform to applicable requirements of Sections 06 4001 and 06 4114.
 2. Use 3/4 inch (19 mm) Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC edge banding with eased edges. Apply banding on exposed edges with one inch (25 mm) return onto unexposed edges. Edge banding color to match Panel Product.

2.2 SOURCE QUALITY CONTROL

A. Inspections:

1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION Not Used

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. Association Publications:
1. American Architectural Manufacturers Association (AAMA):
 - a. 'Voluntary Specifications and Test Methods for Sealants'.
 2. ASM International:
 - a. 'Adhesives and Sealants', Volume 3, ASM International Handbook Committee, (May 1999).
 - b. Committee C24 on Building Seals and Sealants for various Specifications, Guides, Test Methods, and Practices related to sealant specifying and application.
 - c. Committee E6 on Building Performance for various Specifications, Guides, Test Methods, and Practices related to sealant use with air barriers, vapor retarders, and exterior enclosure systems and materials.
 3. The Adhesive and Sealing Council, Inc. (ASC) / Sealant, Waterproofing & Restoration Institute (SWR Institute):
 - a. 'Sealants: The Professional's Guide'.
 - b. 'Joint Sealants, Whole Building Design Guide'.
- B. Definitions:
1. Adhere: To cause two surfaces to be held together by adhesion.
 2. Adhesive: An adhesive, as defined by The American Society for Testing and Materials (ASTM), is 'a substance capable of holding materials together by surface attachment'.
 3. Caulk: Caulks have variety of definitions but are generally recognized as materials used in applications where only minor elastomeric properties are needed.
 4. Elastomer: Rubbery material which returns to approximately its original dimensions in short time after relatively large amount of deformation.
 5. Flow: Movement of adhesive during bonding process before adhesive is set.
 6. Joint: Location at which two substrates are held together with layer of adhesive.
 7. Primer: Coating applied to surface, prior to application of an adhesive, to improve performance of the bond.
 8. Sealant. Sealants are generally used in applications where elastic properties are needed while adhesives are generally used in applications where bonding strength and rigidity are needed. With technology advancements both sealants and adhesives can be used interchangeably depending on applications performance requirements.
 9. 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.
- b. Federal Specifications:
- 1) Type:
 - a) Type I: Self-leveling, pour grade.
 - (1) Compound which has sufficient flow to give smooth level surface when applied in horizontal joint at 40 deg F (4.4 deg C).
 - b) Type II: Non-sag, gun grade
 - (1) Compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures 40 deg F (4.4 deg C) and 122 deg. F (50 deg. C).
 - c) Type NS: Non-sag, gun grade.
 - (1) Non-sag shall be a compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures between -20 deg F and 122 deg. F (- 29 and 50 deg. C).
 - 2) Class:
 - a) Class A: Compounds resistant to 50 percent total joint movement (includes Type I and Type II).
 - (1) Capable of resisting compression-extension cycling of plus and minus 25 percent of nominal half inch width.
 - b) Class B: Compounds resistant to 25 percent total joint movement (includes Type I and Type II).
 - (1) Capable of resisting compression-extension cycling of plus and minus 12 1/2 percent of nominal half inch width.
10. Shelf Life: Period of time, usually beginning with date of manufacture, during which stored adhesive will remain effective or useful.
 11. 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).
 12. Stability: Ability of material to remain unchanged.

13. Storage Life: Period of time during which packaged adhesive can be stored under specified temperature conditions and remain suitable for use.
14. Substrate: Material upon surface of which an adhesive-containing substance is spread for any purpose, such as bonding or coating.
15. Surface Preparation: Physical and /or chemical preparation of substrate to render it suitable for adhesive joining. Same as substrate preparation or pre-bond preparation.
16. Toxicity: Material shall have no adverse effect on health of personnel when used for its intended purpose.

C. Reference Standards:

1. American Association of State and Highway Transportation Officials:
 - a. AASHTO T 132-87(2013), 'Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars'.
2. ASTM International:
 - a. ASTM C639-01(2011), 'Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants'.
 - b. ASTM C661-06(2011), 'Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer'.
 - c. ASTM C679-03(2009), 'Standard Test Method for Tack-Free Time of Elastomeric Sealants'.
 - d. ASTM C719-13, 'Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)'.
 - e. ASTM C793-05(2010), 'Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants'.
 - f. ASTM C794-10, 'Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants'.
 - g. ASTM C920-14, 'Standard Specification for Elastomeric Joint Sealants'.
 - h. ASTM C1135-00(2011), 'Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants'.
 - i. ASTM C1184-13, 'Standard Specification for Structural Silicone Sealants'.
 - j. ASTM C1193-13, 'Standard Guide for Use of Joint Sealants'.
 - k. ASTM C1248-08(2012), 'Standard Test Method for Staining of Porous Substrate by Joint Sealants'.
 - l. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
 - m. ASTM C1481-12 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
 - n. ASTM D412-06(2013), 'Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension'.
 - o. ASTM D2202-00(2010), 'Standard Test Method for Slump of Sealants'.
 - p. ASTM D2240-05(2010), 'Standard Test Method for Rubber Property-Durometer Hardness'.
 - q. ASTM D5893-10, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.
 - r. ASTM E119-12a, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
3. Federal Specifications:
 - a. Federal Specification TT-S-001543A (CON-NBS), 'Sealing Compound: Silicone Rubber Base (for Calking, Sealing & Glazing in Buildings and Other Structures)' (9 Jun 1971).
 - b. TT-S-00230C (CON-NBS), 'Sealing compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures.' (2 Feb 1970).
4. Government Services Administration (GSA), Commercial Item Descriptions (CID):
 - a. GSA CID A-A-272A, 'Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.
 - b. GSA CID A-A-1556, 'Sealing Compound Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.

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.
- C. Mockups:
 1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
 - a. Incorporate accepted mockup as part of 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 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 C639 or ASTM D2202: Flow (sag or slump).
 - 3) ASTM C661 or ASTM D2240: Durometer hardness (shore A).
 - 4) ASTM C679 or ASTM C794: Tack free time (peel strength).
 - 5) ASTM C719: Joint movement capability.
 - 6) ASTM 793: Effects of accelerated weathering.
 - 7) ASTM C1135 or ASTM D412: Tensile adhesion strength.
 - 8) ASTM C1184: Structural silicone sealants.
 - 9) ASTM C1248: Staining.
 - 10) ASTM D412: Modulus.
 - 11) ASTM D5893: Silicone Joint Sealant for Concrete Pavements.
 - 12) Federal Specification TT-S-001543A.
 - 13) Federal Specification TT-S-00230C.
 - 14) GSA CID A-A-272A.

- 15) GSA CID A-A-1556.
 - 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 particular 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 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 componets.
 - b. Design Criteria:
 - 1) Meet following standards for Sealant:
 - a) ASTM C920: Type S Grade NS, Class 25 (min) Use A.
 - 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, or frost. Prepare substrates in accordance with Manufacturer's instructions:
 - a. Porous surfaces: Abrasive-clean followed by blasting with oil-free compressed air.
 - b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193.
 - c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
 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

SECTION 08 1429**FLUSH WOOD DOORS: Factory-Finished, Clear****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Factory-finished flush wood doors.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for cabinet doors.
 - 3. Section 06 4817: 'Fire-Rated Wood Door Frames'.
 - 4. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Abbreviations And Acronyms:
 - 1. AWS: Architectural Woodwork Standards (formerly AWI).
 - 2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
 - 3. FD-5: Core with 2 layers on each side.
 - 4. ME: Matching edges, i.e., vertical edges same as decorative faces.
 - 5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
 - 6. PC-5: Core with 2 layers on each side.
- B. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- C. Definitions:
 - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
 - 2. Fire-rated: Fire-retardant particleboard with an Underwriters' Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
 - 3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
 - 4. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
 - 5. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.

- D. Reference Standards:
1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
 - a. AAMA/WDMA/CSA 101/I.S.2/A440-11, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
 2. ASTM International:
 - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
 - b. ASTM C1048-12, 'Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass'.
 3. Hardwood, Plywood, and Veneer Association:
 - a. HPVA HP-1-2009 'Standard for Hardwood and Decorative Plywood'.
 4. National Particleboard Association / Composite Panel Association:
 - a. NPA A208.1-2009, 'Particleboard'.

1.3 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
 - a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.
 - b. Indicate factory finish color and type.
 2. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide **8 inch by 10 inch (200 mm by 255 mm)** sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample from project for finish.
- C. Closeout Submittals:
1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's product literature on doors and factory finish.
 - b) Maintenance and repair instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Deliver in clean truck and, in wet weather, under cover.
 2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
 3. Individually wrap in polyethylene bags for shipment and storage.
- B. Storage And Handling Requirements:
1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.

2. Store flat on level surface in dry, well ventilated space.
3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.
6. Leave shipping bag on door after installation until immediately before substantial completion inspection.
7. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

1.5 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's standard full door warranty for lifetime of original installation.
 - a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
 - b. Warranty to include defects in materials including following:
 - 1) Delaminating in any degree.
 - 2) Warp or twist of **1/4 inch (6 mm)** or more in door panel at time of one-year warranty inspection.
 - 3) Telegraphing of core assembly: Variation of **1/100 inch (0.25 mm)** or more in **3 inch (75 mm)** span.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:

1. Category One Approved VMR Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
 - a. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
 - 1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
 - b. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
 - 1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.

B. Manufacturers:

1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
 - a. Graham Wood Doors, Mason City, IA.
 - b. Marshfield Door Systems Inc, Marshfield, WI.
 - c. VT Industries, Holstein, IA.

C. Wood Doors:

1. Type: AWS PC-5ME or FD-5ME.
2. Grade: AWS Premium, except face veneer.
3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
4. Face Veneer:
 - a. Plain sliced Red Oak meeting requirements of AWS Grade A, **1/50 inch (0.5 mm)** thick minimum immediately before finishing.
 - b. Face veneers shall be running book matched.
5. Core:
 - a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
 - b. Non-Rated:
 - 1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
 - 2) Stiles:

- a) 1-3/8 inches (35 mm) deep minimum before fitting.
 - b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
 - 3) Rails:
 - a) 1-1/8 inches (28 mm).
 - b) Manufacturer's option.
- D. Fabrication:
- 1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.
- E. Finishes:
- 1. Factory Finishing:
 - a. Applied by Door Manufacturer before leaving factory.
 - b. Performance / Design Criteria:
 - 1) Finish factory-finish to match Owner selected sample as specified in Section 09 9324.
 - c. Match existing Project Color Scheme:
 - 1) Control Sample provided by Owner:
 - a) Control Sample will be existing wood item from Project.
 - d. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

2.2 SOURCE QUALITY CONTROL

- A. Inspections:
- 1. Verification of Performance:
 - a. Doors shall have following information permanently affixed on top of door:
 - 1) Manufacturer:
 - 2) Door designation or model.
 - 3) Veneer species.
 - 4) Factory finish.
 - 2. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 3313**COILING COUNTER DOORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Coiling counter door.
- B. Related Requirements:
 - 1. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.
 - 2. Section 08 7103: 'Securing Devices' for cylinder.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature or cut sheet.
 - b. Operating and maintenance instructions.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Type One Acceptable Manufacturers:
 - a. Cornell/Cookson, Inc, Mountaintop, PA www.cornelliron.com.
 - b. Overhead Door Corp, Lewisville, TX www.overheaddoor.com.
 - c. Windsor Republic Doors, Little Rock, AR www.windsordoor.com.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Counter Door:
 - 1. Curtain: 6063 extruded aluminum.
 - 2. Barrel And Counterbalance: Designed to provide easy, long-term operation.
 - 3. Guides: 6063 extruded aluminum.
 - 4. Hood: Aluminum.
 - 5. Finish: 204-R1 anodized for exposed elements.
 - 6. Operation: Manual with device to incorporate cylinder locking.

PART 3 - EXECUTION: Not Used**END OF SECTION**

SECTION 08 7101**COMMON FINISH HARDWARE REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General requirements for finish hardware related to architectural wood and hollow metal doors.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for architectural woodwork hardware.
 - 3. Section 08 0601: 'Hardware Group and Keying Schedules'.
 - 4. Section 08 4113: 'Aluminum-Framed Entrances and Storefronts' for storefront hardware.

1.2 REFERENCES

- A. Association Publications:
 - 1. Builders Hardware Manufacturers Association (BHMA), 355 Lexington Avenue, 15th Floor, New York, NY 10017-6603, Tel: 212-297-2122 Fax: 212-370-9047, www.buildershardware.com.
- B. Reference Standards:
 - 1. American National Standards Institute / Builders Hardware Manufacturers Association:
 - a. ANSI/BHMA A156.1-2013, 'Butts & Hinges'.
 - b. ANSI/BHMA A156.3-2008, 'Exit Devices'.
 - c. ANSI/BHMA A156.4-2013, 'Door Controls-Closers'.
 - d. ANSI/BHMA A156.5-2014, 'Cylinders and Input Devices for Locks'.
 - e. ANSI/BHMA A156.6-2010, 'Architectural Door Trim'.
 - f. ANSI/BHMA A156.12-2013, 'Interconnected Locks & Latches'.
 - g. ANSI/BHMA A156.13-2012, 'Mortise Locks & Latches, Series 1000'.
 - h. ANSI/BHMA A156.18-2012, 'Materials and Finishes'.
 - i. ANSI/BHMA A156.19-2013, 'Power Assist and Low Energy Power Operated Doors'.
 - j. ANSI/BHMA A156.21-2014, 'American National Standard for Thresholds'.
 - k. ANSI/BHMA A156.30-2014, 'American National Standard for High Security Cylinders'.
 - l. ANSI/BHMA A156.36-2010, 'American National Standard for Auxiliary Locks'.
 - 2. International Code Council / American National Standards Institute:
 - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
 - 3. Underwriters Laboratories (UL):
 - a. UL 10B, 'Fire Tests of Door Assemblies'.
 - b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Hardware Templates:
 - a. Provide hardware templates to Sections 08 1213, 08 1313, and 08 1429 within fourteen (14) days after Architect approves hardware schedule.
 - b. Supply necessary hardware installation templates to Section 06 2024 before pre-installation conference.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's cut sheets.
 - b. Two (2) copies of Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware. Include one (1) set in 'Operations And Maintenance Manual' and send one (1) set with hardware when delivered.
 - c. Copy of hardware schedule.
 - d. Written copy of keying system explanation.
 - 2. Shop Drawings:
 - a. Submit hardware schedule indicating hardware to be supplied.
 - b. Schedule shall indicate details such as proper type of strikeplates, spindle lengths, hand, backset, and bevel of locks, hand and degree opening of closer, length of kickplates, length of rods and flushbolts, type of door stop, and other necessary information necessary to determine exact hardware requirements.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature and/or cut sheets.
 - b) Include keying plan and bitting schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
 - 1. Neatly and securely package hardware items by hardware group and identify for individual door with specified group number and set number used on Supplier's hardware schedule.
 - 2. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

PART 2 - PRODUCTS

2.1 SUPPLIERS

- A. Existing Projects (Doors and Door Hardware):
 - 1. Category One VMR Approved Suppliers. See Section 01 6200 for definitions of Categories:
 - a. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
 - 1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
 - b. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
 - 1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.

2.2 FINISHES

- A. Hardware Finishes:
 - 1. Match existing door hardware finishes in building.

2.3 FASTENERS

- A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

END OF SECTION

SECTION 08 7102**HANGING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Hinges for flush wood and hollow metal doors.
- B. Related Requirements:
 - 1. Section 08 7101: 'Common Hardware Requirements'.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Hager Companies, St Louis, MO www.hagerhinge.com.
 - b. Ives, New Haven, CT www.iveshardware.com.
 - c. McKinney, Scranton, PA www.mckinneyhinge.com.
 - d. PBB, Ontario, CA www.pbbinc.com.
 - e. Stanley, New Britain, CT www.stanleyworks.com.
- B. Hinges:
 - 1. Doors:
 - a. Sizes:
 - 1) Non-Fire-Rated Doors:
 - a) 1-3/4 inch 44.5 mm non-fire-rated wood doors in wood frames: 4 inches by 4 inches (100 mm by 100 mm).
 - 2. Use non-removable pins on exterior opening doors.
 - 3. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Interior:
 - 1) Hager: BB 1279.
 - 2) Ives: 5BBI.
 - 3) McKinney: TA 2714.
 - 4) MacPro / McKinney: MPB79.
 - 5) PBB: BB81.
 - 6) Stanley: FBB 179.

PART 3 - EXECUTION: Not Used**END OF SECTION**

SECTION 08 7106**CLOSING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Closers for flush wood doors and hollow metal doors.
- B. Related Requirements:
 - 1. Section 08 7101: 'Common Finish Hardware Requirements'.
 - 2. Section 08 7108: 'Stops And Holders'.

1.2 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Manufacturer's final, executed copy of warranty.

1.3 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's Standard Warranty, five (5) years minimum.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. 7900 Series by Dorma Architectural Hardware, Reamstown, PA www.dorma.com/usa.
 - b. 1461 Series by LCN Closers, Princeton, IL www.lcnclosers.com.
 - c. 8501 Series by Norton Door Controls, Charlotte, NC www.nortondoorcontrols.com.
 - d. 1431 Series by Sargent, New Haven, CT www.sargentlock.com.
 - e. D-3550/D-3551 Series by Stanley, Indianapolis IN www.stanlesecuritysolutions.com.
- B. Surface-Mounted Overhead Door Closers:
 - 1. Closers provided under this Section shall be from same Manufacturer.
 - 2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.
 - 3. Closers shall have following features:
 - 1) Adjustable sweep speed.
 - 2) Adjustable backcheck.
 - 3) Non-handed, non-sized.
 - 4. Closer arm functions:
 - a. Cushion stop. Identified as DS3 on the Door Schedule.
 - 1) LCN CUSH-N-STOP 1461-3077CNS.
 - 2) Equal approved by Architect prior to installation.
 - b. Detent hold-open with cushion stop (identified as DS4 on the Door Schedule).

- 1) LCN HCUSH 1461-3049CNS.
- 2) Equal approved by Architect prior to installation.
- c. Regular (identified as DS5 on the Door Schedule).
 - 1) LCN Regular 1461-3077.
 - 2) Equal approved by Architect prior to installation.
- d. Friction hold-open (identified as DS6 on the Door Schedule).
 - 1) LCN HEDA 1461-3049EDA.
 - 2) Equal approved by Architect prior to installation.
- e. Detent hold-open with spring and cushion stop (identified as DS7 on the Door Schedule).
 - 1) LCN Spring HCUSH 1461-3049SCNS.
 - 2) Equal approved by Architect prior to installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount closers on stop side of door wherever conditions permit.
- B. Through-bolt hardware-to-door connections.
- C. Mount closers to control degree of door swings as indicated on the Door Schedule.

3.2 ADJUSTING

- A. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

END OF SECTION

SECTION 08 7107**PROTECTIVE PLATES AND TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Kick plates.
- B. Related Requirements:
 - 1. Section 08 7101: Common Hardware Requirements and VMR Suppliers.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. 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 installation. See Section 01 6200.
- B. Protective Plates:
 - 1. Material: 0.050 inch (1.27) mm thick Stainless Steel.
 - 2. Sizes:
 - a. Kick Plates: 10 inches (255) mm high by width of door less 3/4 inch (19 mm) on each side.

PART 3 - EXECUTION: Not Used**END OF SECTION**

SECTION 08 7108**STOPS AND HOLDERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Supplied But Not Installed Under This Section:
 - 1. Door stops.
- B. Related Sections:
 - 1. Section 08 7101: Common Hardware Requirements.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - b. Hager, St Louis, MO www.hagerhinge.com.
 - c. Ives, Wallingford, CT www.iveshardware.com.
 - d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - e. Sargent, New Haven, CT (800) 906-6606 or (203) 562-2151 www.sargentlock.com.
- B. Stops:
 - 1. Use wall type stops unless indicated otherwise on Door Schedule.
 - 2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
 - 3. Type Two Acceptable Products:
 - Interior Wall
 - a. Hager 236W
 - b. Ives WS407CCV
 - c. Rockwood 409
 - d. Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Interface With Other Work: When using overhead stops, coordinate installation with door closer and other door hardware.

END OF SECTION

SECTION 08 7109**ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Acoustical seals.
 - 2. Smoke Gaskets.
 - 3. Sweep Strip (door bottom sweep) for hollow metal door only.
 - 4. Thresholds (metal) where required for wood doors and hollow metal doors.
 - 5. Weatherstripping for exterior hollow metal doors.
 - 6. Door bottoms/door sweeps.

- B. Related Requirements:
 - 1. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for thresholds.
 - 2. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.
 - 3. Section 09 3013: 'Ceramic Tiling' for stone thresholds.
 - 4. Section 09 6466: 'Wood Athletic Flooring' for flooring system thresholds.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Architectural Manufacturers Association (AAMA):
 - a. AAMA 609 & 609-09, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined document).
 - b. AAMA 611-12, 'Voluntary Standards for Anodized Architectural Aluminum'.
 - c. AAMA 701/702-11, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
 - 2. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. AMP 500-06, 'Metal Finishes Manual' for Architectural and Metal Products.

- B. Reference Standards:
 - 1. American National Standards Institute / Builders Hardware Manufacturers Association:
 - a. ANSI / BHMA A156.18-2012, 'Materials and Finishes'.
 - b. ANSI / BHMA A156.21-2014, 'American National Standard for Thresholds'.
 - 2. International Code Council / American National Standards Institute:
 - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Hager, St Louis, MO www.hagerhinge.com.
 - b. Ives, Wallingford, CT www.iveshardware.com.
 - c. NGP - National Guard Products, Memphis, TN www.ngpinc.com.
 - d. Pemko Manufacturing, Ventura, CA www.pemko.com.

- B. Acoustical Seals:
1. Color as selected by Architect.
 2. Type One Acceptable Products:
 - a. Door Bottom Shoe for Wood Door:
 - 1) 13VDkB by NGP.
 - 2) 211DV by Pemko.
 - b. Door Bottom Shoe for Metal Door:
 - 1) 779S-A by Hager.
 - 2) 35EV by NGP.
 - 3) 217AV by Pemko.
 - c. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Smoke Gaskets:
1. Color as selected by Architect.
 2. Type One Acceptable Products:
 - a. 726 by Hager.
 - b. 5050 by NGP.
 - c. PK 55 by Pemko.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- D. Sweepstrip (metal door bottom):
1. Clear anodized aluminum with black neoprene insert.
 2. Reduce infiltration of air, wind, dust, rain, and snow.
 3. Meet UL requirements.
 4. For use with saddle thresholds.
 5. Type One Acceptable Products:
 - a. 750S CLR by Hager.
 - b. 198N A by NGP.
 - c. 321 CN by Pemko.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- E. Thresholds:
1. Type One Acceptable Products:
 - a. Design Criteria:
 - 1) Meet handicap accessibility requirements (ADA):
 - b. Interior Doors at Acoustic Seals, Approved Products:
 - 1) Carpet threshold (carpet to carpet):
 - a) 505S DBA by Hager.
 - b) 414 DKB by NGP.
 - c) 236 D by Pemko.
 - 2) Carpet threshold (carpet to concrete, wood, synthetic, or resilient flooring):
 - a) 417 DKB by NGP.
 - b) 174 D by Pemko.
 - 3) Saddle threshold:
 - a) 418S DBA by Hager.
 - b) 411 DKB by NGP.
 - c) 151 D by Pemko.
 - c. Out swinging metal exterior doors (exterior Utility Rooms only):
 - 1) 891 V by NGP.
 - 2) 185 V by Pemko.
 - d. Equals as approved by Architect before bidding. See Section 01 6200.
- F. Weatherstripping:
1. Type One Acceptable Products:
 - a. Finish: clear anodized aluminum.
 - b. Perimeter:
 - 1) 800S by Hager.
 - 2) A625 A by NGP.
 - 3) 35041 CP by Pemko.
 - c. Equal as approved by Architect before bidding. See Section 01 6200.

- d. Bottom (see Sweepstrip)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install smoke gaskets and acoustical seals in manner to give continuous air-tight fit.
 - 1. Install smoke gaskets as per Manufacturer's installation requirements:
 - a. Hinge Jamb: Install smoke gaskets on jamb face of door frame so door will compress smoke gasket.
 - b. Header and Strike Jamb: Install smoke gaskets on face of stop of door frame so door will compress smoke gasket.
 - 2. Install acoustical seal with seal under door.

END OF SECTION

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. Sections Under 08 1000 Heading: 'Doors And Frames' for furnishing and installing of flush wood door lites in new doors.
 2. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.
 3. Section 08 5113: 'Vinyl Windows' for furnishing and installing of glazing in windows.

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. Obscure Glass: Adds privacy where window coverings are impractical or undesirable. Various colors and texture patterns provide translucent or semi-opaque effect. May be tempered for use where safety glass is required.
 6. 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.
 7. 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.
 8. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
 9. 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.

10. 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.
11. 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 C1048-12, '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. PPG Industries, Pittsburgh, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.
- B. Exterior Window Glazing:
1. Thickness: **1/8 inch (3 mm)** minimum, Double Strength (Insulated Glass).
 2. Glazing shall have following characteristics:
 - a. Low-Emissivity (or Low E):
 - 1) Design Criteria:
 - a) Clear:
 - b) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.

- c) Location: Surface 2.
 - 2) Type Two Low-Emissivity (or Low E) Acceptable Product:
 - a) Performance Standard:
 - (1) 70 percent Visible Light Transmission (VLT).
 - (2) 0.29 U-value winter.
 - (3) 0.27 U-value summer.
 - (4) 0.38 Solar Heat Gain Coefficient (SHGC).
 - (5) 0.44 Shading Coefficient.
 - (6) 11 percent Visible Light Reflectance.
 - b) Quality Standard:
 - (1) Cardinal LoE³-366.
 - (2) Solarban 70 XL.
 - (3) Other low E glazing system standard with window manufacturer that meets or exceeds performance characteristics of specified glazing is acceptable as approved by Architect before bidding. See Section 01 6200.
 - 3) Acceptable Manufacturers:
 - a) AGC.
 - b) Guardian.
 - c) PPG Industries.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
 - b. Obscure:
 - 1) Design Criteria:
 - a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.
 - c. Glazing in Windows within 24 inches (600 mm) of Doors:
 - 1) Design Criteria:
 - a) Tempered.
 - b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.
- C. 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 Coefficient (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) PPG.
 - 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.

D. 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. Install muntins for exterior aluminum entries and aluminum windows between panes of insulating glazing units. No muntins on interior Vestibule storefront entries.
3. 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. Insulated obscure units shall consist of one pane of specified obscure glass and one pane of standard glass.
 - d. Type Seal:
 - 1) Metal-to-glass bond and separated by **1/2 inch (12.7 mm)** dehydrated air space.
 - 2) Use non-hardening sealants.
 - e. 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

SECTION 09 2300**GYPSUM PLASTER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install complete application of interior gypsum plaster as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
1. ASTM International:
 - a. ASTM C28/C28M-10(2015), 'Standard Specification for Gypsum Plasters.'
 - b. ASTM C35-01(2014), 'Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster.'
 - c. ASTM C61/C61M-00(2015) Standard Specification for Gypsum Keene's Cement.'
 - d. ASTM C206-14, 'Standard Specification for Finishing Hydrated Lime.'
 - e. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes.'
 - f. ASTM C842-05(2015), 'Standard Specification for Application of Interior Gypsum Plaster.'

1.3 FIELD CONDITIONS

- A. Ambient Conditions:
1. Temperature in building shall be uniform and maintained at **55 deg F (13 deg C)** minimum for week before application of plaster, during plastering operations, and until after plaster is dry. Use screens to protect from uneven heat if necessary.
 2. Provide ventilation to properly dry plaster during and subsequent to its application. This ventilation may be from outside air or mechanical ventilation. Avoid freezing or hot, dry winds.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Performance:
1. Design And Performance Criteria:
 - a. Follow recommendations of ASTM C842 unless otherwise specified in this Section.
 - b. Required Coats:
 - 1) Hollow Masonry: Two coats (double-up method).
 - 2) Metal Lath, Gypsum Lath, or Concrete: Three coats.
- B. Materials:
1. Water: Clean, suitable for drinking.
 2. Plaster:
 - a. Gypsum Ready Mixed Plaster (Optional): Meet requirements of ASTM C28/C28M.
 - b. Gypsum Neat Plaster: Meet requirements of ASTM C28/C28M.

- c. Gauging Plaster: Meet requirements of ASTM C28/C28M. Use fibered type for scratch coat over metal lath.
 3. Hydrated Lime: Meet requirements of ASTM C206 or ASTM C207, Type S, Manufacturer's designation to appear on bag.
 4. Keene's Cement: Meet requirements of ASTM C61/C61M.
 5. Lime Putty: Make from hydrated lime in accordance with Manufacturer's directions.
 6. Sand:
 - a. Meet requirements of ASTM C35.
 - b. Sand for sand float finish coats shall pass No. 20 screen and be white, hard, sharp grains, free from soluble salts or injurious amounts of organic matter.
 7. Bonding Agent:
 - a. Type Two Acceptable Manufacturers:
 - 1) Plaster-Weld by Larsen Products Corp, Jessup, MD www.larsenproducts.com.
 - 2) Equal as approved by Architect before use. See Section 01 6200.
- C. Mixes:
1. Basecoat Proportions:
 - a. Two Coat Work: One part gypsum neat plaster, 2-1/2 parts dry sand.
 - b. Three Coat Work:
 - 1) Scratch Coat: One part gypsum, 2 parts dry sand.
 - 2) Brown Coat: One part Gypsum neat plaster, 3 parts dry sand.
 - c. Mixing:
 - 1) Job Mixed Gypsum Plasters:
 - a) Put in approximate amount of water.
 - b) If sand is used, add approximately 1/2 amount of aggregate. If vermiculite or perlite is used, add all aggregate.
 - c) Add cementitious materials.
 - d) Add remainder of sand aggregate.
 - e) Mix to required consistency, adding water if necessary.
 - f) Dump entire batch and use.
 - 2) Ready-Mixed Gypsum Plasters:
 - a) Put in approximate amount of water.
 - b) Add plaster.
 - c) Mix to required consistency, adding water if necessary.
 - d) Dump entire batch and use.
 - 3) Withhold approximately 10 percent of established quantity of mixing water from mortar until mixing is almost complete, then add as needed to produce necessary consistency. It is also recommended that mixer not be allowed to run longer than three minutes after all materials have been added.
 2. Finish Coat Proportions:
 - a. Trowel Finish (by volume):
 - 1) Lime Putty: 3 Parts.
 - 2) Gypsum Gauging Plaster: 1 Part.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check lathed areas and furring for defects before proceeding. Do not apply plaster until defects are corrected.

3.2 PREPARATION

- A. Protection: Protect building from damage due to this work.

3.3 INSTALLATION

- A. Tolerances:
1. Finish plaster true and even, with **1/8 inch (3 mm)** tolerance in **10 feet (3 meters)** without waves, cracks, or imperfections.
 2. Required Thickness:
 - a. Plaster Base Thickness including Finish Coat:
 - 1) Masonry: **5/8 inch** minimum.
- B. Two Coat Work (Double-up Method):
1. Install or see that plaster base is properly installed.
 2. Attach grounds and apply screeds.
 3. Apply first thickness and double back immediately with second thickness to depth of screeds. Apply first coat with sufficient materials and pressure to form good bond and cover well.
 4. Remaining steps are similar to steps '8' through '18' in outline below for applying three coats of work.
- C. Three Coat Work:
1. Install or see that plaster base is properly installed. If base is concrete, roughen surface to provide mechanical bond or use bonding agent.
 2. Attach grounds.
 3. Apply scratch coat approximately **3/16 inch (5 mm)** thick, measured from face of base material. Curl keys around metal lath.
 4. Before scratch coat sets, rake and cross rake furrows **1/8 inch (3 mm)** deep, **1/8 inch (3 mm)** wide, and **1/2 to 3/4 inch (12.7 to 19 mm)** apart.
 5. Allow scratch coat to set firm and hard.
 6. Apply plaster screed, if required.
 7. Apply brown coat to depth of screeds twelve hours or more after scratch coat has been applied.
 8. Using screeds as guide, straighten surface with rod (straightedge).
 9. Fill in hollows or voids and rod surface again.
 10. Level and compact surface with darby. Rake and cross rake to receive finish coat.
 11. Corners should now be sharply defined and plaster trimmed back and around grounds (corner beads, casing, etc) to allow finish coat to be applied flush with face of ground.
 12. Allow brown coat to set hard and firm. Finish coat applied in next operation can be placed over partially dry brown coat or one allowed to dry thoroughly and then wetted evenly by brushing or spraying.
 13. Apply finish coat first to angles over partially dry base coat.
 14. Straighten angles with rod, or featheredge.
 15. Fill surface between angles with 'skim' coat of plaster. Pressure on trowel shall be sufficient to force materials into rough surface of base coat in order to provide contact for bond.
 16. Double back on surface immediately with sufficient material to bring finish coat to final thickness.
 17. Next, float angles. It may be necessary to apply small additional amount of plaster during floating to fill minor voids that appear in surface.
 18. Float and fill depressions ('drawing-up').
- D. Trowel Finishes:
1. Allow to 'draw' for a few minutes. When surface becomes dull, proceed with final troweling.
 2. Lightly brush surface with water. Trowel immediately after water application. It is important that all possible pressure be applied to trowel in order to compact finish.
 3. Rapidly trowel surface without interruption, then repeat troweling operation and continue until plaster has set. Trowel shrinkage cracks that appear before setting action takes place.
 4. Finish coats shall be free of blemishes or irregularities.
 5. Type of finish as determined by Architect.

3.4 ADJUSTING

- A. Cracked, blistered, pitted, checked, or discolored plaster is not acceptable. Remove such plaster and replace with matching surface.
- B. Do patching for all trades and repair unnecessary damage to plaster occasioned by them at no cost to Owner, making neat job.
- C. Point around steel and iron work, fixtures, outlet boxes, piping, and other appliances abutting or extending into plastering.

3.5 CLEANING

- A. Maintain premises in neat condition. Leave floors broom clean. Clean plaster from stops, beads, trim, etc.

END OF SECTION

SECTION 09 2900**GYPSUM BOARD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.
- B. Related Requirements:
1. Section 09 3013: 'Ceramic Tile' for installation of backerboard joint reinforcing.
 2. Section 09 9413: 'Interior Textured Finishing'.

1.2 REFERENCES

- A. Definitions:
1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
 2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
 3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
 4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.
- B. Reference Standards:
1. ASTM International:
 - a. ASTM C11-15, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
 - b. ASTM C475/C475M-15, 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
 - c. ASTM C840-13, 'Standard Specification for Application and Finishing of Gypsum Board'.
 - d. ASTM C1002-14, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
 - e. ASTM C1047-14a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
 - f. ASTM C1178/C1178M-13, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
 - g. ASTM C1396/C1396M-14, 'Standard Specification for Gypsum Board'.
 - h. ASTM E84-15, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - i. ASTM E119-15, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
 2. Gypsum Association:
 - a. GA-214-15, 'Recommended Levels of Gypsum Board Finish'.
 - b. GA-216-10: 'Application and Finishing of Gypsum Panel Products'.
 - c. GA-600-15, 'Fire Reference Design Manual'.

- d. GA-801-07, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
3. International Building Code (IBC) (2015 or latest approved version):
 - a. Chapter 25, 'Gypsum Board And Plaster'.
4. Underwriters Laboratories, Inc.
 - a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
 - b. UL 723: 'Test for Surface Burning Characteristics of Building Materials; (10th Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 1. Schedule pre-installation conference immediately before installation of gypsum wallboard.
 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. Test And Evaluation Reports:
 - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
 1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
 1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
 1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
 - a. Do not install interior products until installation areas are enclosed and conditioned.
 - 1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
 - 2) Provide ventilation to eliminate excessive moisture.
 - 3) Avoid hot air drafts that will cause too rapid drying.
 - b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. American Gypsum, Dallas, TX www.americangypsum.com.
 - b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
 - c. Georgia Pacific, Atlanta, GA www.gp.com.
 - d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - e. Pabco Gypsum, Newark, CA www.pabco gypsum.com.
 - f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:

1. Interior Gypsum Board:
 - a. General:
 - 1) Size:
 - a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 2) Class Two Quality Standard:
 - a) Core: Fire-resistant rated gypsum core.
 - b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
 - c) Surface paper: Face paper suitable for painting.
 - d) Long edges: Tapered edge.
 - e) Overall thickness: **5/8 inch (15.9 mm)**.
 2. Glass Mat Gypsum Tile Backer:
 - a. Product meeting requirements of ASTM C1178/C1178M.
 - b. **5/8 inch (15.9 mm)**.
 - c. Square edges.
 - d. Category Four Approved Manufacturer. See Section 01 6200 for definitions of Categories:
 - 1) DensShield Tile Backer by Georgia Pacific.
 - 2) GlasRoc Tilebacker by CertainTeed.

2.2 ACCESSORIES

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
 - b. Magnum Products, Lenaxa, KS www.levelcoat.com.
 - c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
 - e. United States Gypsum Co, Chicago, IL www.usg.com.
 - f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
 - g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
2. Gypsum Board Mounting Accessories:
 - a. Furring Channels:
 - 1) Class Two Quality Standards. See Section 01 6200 for definitions:
 - a) Walls: Galvanized DWFC-25.
 - 2) Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.
 - b. Corner And Edge Trim:
 - 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
 - c. Control Joint:
 - 1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
3. Joint Compound:

- a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
 - 1) Use Taping Compound for first coat to embed tape and accessories.
 - 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
 - 3) Use Finishing Compound for final coat and for skim coat.
4. Joint Reinforcing:
 - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
5. Fasteners:
 - a. Bugle head screws meeting requirements of ASTM C1002:
 - 1) Gypsum Board:
 - a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing **5/8 inch (15.9 mm)** minimum.
 - b) Type S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing **3/8 inch (9.5 mm)** minimum.
 - 2) Glass Mat Gypsum Tile Backer:
 - a) Wood Framing: **11 ga (0.1233 in) (3.1318 mm)**, galvanized with **7/16 inch (11 mm)** head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.
 - b) Metal Framing:
 - (1) Light-gauge metal framing: Type S Hi-Lo, bugle or wafer head, self-tapping, rust resistant. Hi-Lo screws.
 - (2) Heavy-gauge metal framing: Type S-12 Hi-Lo, bugle or wafer head, rust resistant.
- B. Primer / Surfacers On Surfaces To Receive Texturing:
 1. Type Two Acceptable Products:
 - a. Sheetrock First Coat by USG.
 - b. Prep Coat by Westpac Materials.
 - c. Level Coat by Magnum Products.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Primer On Surfaces To Receive Wallcovering:
 1. White, self-sizing, water based, all purpose wallcovering primer.
 2. Type Two Acceptable Products:
 - a. Shieldz Universal Pre-Wallcovering Primer by Wm. Zinsser and Company.
 - b. Equal as approved by Architect before application. 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 gypsum board.
 2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install board over unsuitable conditions.
 4. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Interface With Other Work:
 1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
 2. Do not install gypsum board until required blocking is in place.

- B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.
- C. Interior Gypsum Board:
1. General:
 - a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over **1/8 inch (3 mm)** wide before taping are acceptable.
 - b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
 - c. On walls over **108 inches (2 700 mm)** high, apply board perpendicular to support
 - d. Butt edges in moderate contact. Do not force in place. Shim to level.
 - e. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
 - f. Scribe work closely:
 - 1) Keep joints as far from openings as possible.
 - 2) If joints occur near an opening, apply board so vertical joints are centered over openings.
 - 3) No vertical joints shall occur within **8 inches (200 mm)** of external corners or openings.
 - g. Install board tight against support with joints even and true. Tighten loose screws.
 - h. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
 2. Ceilings:
 - a. Apply ceilings first using minimum of two (2) men.
 - b. Use board of length to give minimum number of joints.
 - c. Apply board perpendicular to support.
 - d. Chapel and Cultural Hall:
 - 1) Double Layer Application:
 - a) Apply base layer:
 - (1) End and edge joints of board applied on ceilings do not need to be back blocked in field area of ceiling.
 - (2) **2x4 (38 mm by 89 mm)** blocking is required at wall to ceiling transitions and at top of ceiling vault transitions.
 - b) Apply face layer with joints staggered in relationship to base and occurring over supports:
 - (1) Use combination of adhesive and screws if required to meet Manufacturer's specifications for fire-rated assembly.
 - (2) Apply screws attaching face layer through base layer into support for specified penetration.
 3. Fastening:
 - a. Apply from center of board towards ends and edges.
 - b. Apply screws **3/8 inch (9.5 mm)** minimum from ends and edges, **one inch (25 mm)** maximum from edges, and **1/2 inch (13 mm)** maximum from ends.
 - c. Spacing:
 - 1) Ends: Screws not over **7 inches (175 mm)** on center at edges where blocking or framing occurs.
 - 2) Wood Framed Walls And Ceilings: Screws **7 inches (175 mm)** on center in panel field.
 - 3) Metal Framed Walls: Screws **12 inches (300 mm)** on center in panel field.
 - d. Set screw heads **1/32 inch (0.8 mm)** below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw **2 inches (50 mm)** away.
 - e. Screws on adjacent ends or edges shall be opposite each other.
 - f. Drive screws with shank perpendicular to face of board.
 4. Trim:
 - a. Corner Beads:
 - 1) Attach corner beads to outside corners.
 - a) Attach metal corner bead with staples spaced **4 inches (100 mm)** on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
 - b) Set paper-faced trim in solid bed of taping compound.

- b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames **1/8 inch (3 mm)** to allow for caulking.
5. Finishing:
- a. General:
 - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
 - 2) First Coat:
 - a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
 - b) Completely fill gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
 - 3) Second Coat:
 - a) Apply coat of specified joint compound over embedded tape extending **3-1/2 inches (88 mm)** on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
 - b) Re-coat gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly to eliminate high spots or excessive compound.
 - 4) Third Coat: Apply same as second coat except extend application **6 inches (150 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
 - 5) Fourth Coat: Apply same as second coat except extend application **9 inches (425 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
 - a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:
 - 1) Gypsum Board Surfaces not painted or finished:
 - a) GA-214 Level 1: 'All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable'.
 - 2) Gypsum Board Surfaces Under Acoustical Tile:
 - a) GA-214 Level 2: 'All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
 - b) Note: It is critical that gypsum board ceiling be smooth before installing ceiling tile. Drywall joints must be as specified in paragraph above.
 - 3) Gypsum Board Surfaces to Receive: Wall Covering Type A - Section 09 7226: 'Sisal Wall Covering':
 - a) GA-214 Level 3: 'All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified wall covering primer'.
 - 4) Gypsum Board Surfaces to Receive: Acoustic Wall Fabric Type B - Section 09 7216, 'Vinyl-Coated Fabric Wall Covering':
 - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

- 5) Gypsum Board Surfaces to Receive: Painted Texturing - Section 09 9413: 'Interior Textured Finishing':
 - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.
 - 6) Gypsum Board Surfaces to Receive: Smooth Gypsum Board Surfaces:
 - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.
- D. Glass Mat Gypsum Tile Backer:
1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced **6 inches (150 mm)** on center on edges and into all framing members. Drive screws flush with surface of board.
 2. Shim board to be plumb and flat or level and flat, depending on location.
 3. Apply reinforcing only at joints where abutting different materials.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - a. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 CLEANING

- A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 3013

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install ceramic tile and tile setting materials and accessories as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 2900: 'Gypsum Board' for installation of backerboard behind ceramic tile, except for joint reinforcing.
 - 2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for floor drains installed in ceramic tile floors.
- C. Products Installed But not Furnished Under This Section:
 - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
 - 1. Section 07 9213: 'Elastomeric Joint Sealants'.

1.2 REFERENCES

- A. Association Publications:
 - 1. American National Standard Specification (ANSI) for the Installation of Ceramic Tile.
 - 2. International Standards Organization (ISO) 13007, 'Classification for Adhesives and Grout'.
 - 3. Tile Council of North America:
 - a. TCNA Handbook, 'Handbook for Ceramic, Glass, and Stone Tile Installation, 2015'.
- B. Definitions:
 - 1. Crack Isolation: Prevention of transfer of cracks from substrate through tile or stone when substrate is subjected to horizontal movement of cracks.
 - 2. Dynamic Coefficient of Friction (DCOF): Measures ratio of forces necessary to keep two surfaces sliding.
 - 3. Epoxy Grout: Mortar system employing epoxy resin and epoxy hardener portions.
 - 4. Grout: Rich or strong cementitious or chemically setting mix used for filling tile joints.
 - 5. ISO 13007 Standards Product Classifications:
 - a. Adhesives:

Types	Classes	Special Characteristics
C = Cementitious (Thin-Set Mortars)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant E = Extended Open Time S1 = Deformable S2 = Highly Deformable P1 = Plywood Adhesion P2 = Improved Plywood Adhesion
D = Dispersion (Mastics)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant

		E = Extended Open Time
R = Reaction Resin (Epoxies)	1 = Normal 2 = Improved	T = Slip-Resistant

- 1) Cementitious Adhesive (C): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, and organic additives (e.g. latex polymers, moisture retention additive, etc...) to be mixed with water or latex admix before mixing.
- 2) Dispersion Adhesive (D): Ready-to-use mixture of organic binding agents in the form of an aqueous polymer dispersion, organic additives and mineral fillers - mastic type products.
- 3) Reaction Resin Adhesive (R): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
- 4) Class 1 (1): Adhesive has passed minimum pass level tests that are mandatory for that adhesive type.
- 5) Class 2 (2): Adhesive has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 6) Fast-Setting (F): Adhesive with accelerated cure time that must achieve minimum strength requirements of fast setting adhesive. This designation does not apply to reaction resin adhesives (R).
- 7) Slip-Resistance (T): Downward movement of a tile applied to combed adhesive layer on vertical surface must be ≤ 0.5mm for a C or D adhesive, and ≤ 5mm for a type R adhesive.
- 8) Extended Open Time (E): Maximum time interval after application at which tiles can be embedded in applied adhesive and meet tensile adhesion strength requirement must be ≥ 30 minutes. This designation does not apply to reaction resin adhesives (R).
- 9) Deformability (S): Capacity of hardened adhesive to be deformed by stresses between tile and substrate without damage to installed surface – to pass S1 requirements an adhesive must be able to deform ≥ 2.5mm but < 5mm; to pass S2 requirements an adhesive must be able to deform ≥ 5mm. This designation does not apply to reaction resin adhesives (R).
- 10) Exterior Glue Plywood (P): Adhesive with ability to bond tile or stone to exterior glue plywood substrates (interior only). This designation does not apply to reaction resin adhesives (R) or dispersion adhesives (D).

b. Grouts:

Types	Classes	Special Characteristics
CG = Cementitious Grout	1 = Normal 2 = Improved	F = Fast-Setting A = High Abrasion Resistance W = Reduced Water Absorption
RG = Reaction Resin Grouts	1 = Normal 2 = Improved	Higher performance characteristics than improved cementitious grouts

- 1) Cementitious Grout (CG): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, inorganic and organic additives (e.g. latex polymers, moisture retention additive, etc...).
- 2) Reaction Resin Grout (RG): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
- 3) Class 1 (1): Grout has passed minimum pass level tests that are mandatory for cementitious grouts.
- 4) Class 2 (2): Cementitious grout has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 5) Fast-Setting (F): Grout with accelerated cure time that must achieve minimum compressive strength requirements under normal conditions within twenty four (24) hours. This designation applies only to cementitious grouts (CG).

- 6) High Abrasion Resistance (A): Capability of grout to resist wear. This designation applies only to cementitious grouts (CG).
- 7) Reduced Water Absorption (W): Grout has lower water absorption rate than standard cementitious grout. This designation applies only to cementitious grouts (CG).
- 6. Latex/Polymer Modified Portland Cement Mortar: Latex/Polymer modified portland cement mortar is a mixture of portland cement, sand, and special latex/polymer additive that is used as a bond coat for setting tile.
- 7. Pavers: Unglazed porcelain or natural clay tile formed by dust-pressed method and similar to ceramic mosaics in composition and physical properties but relatively thicker with 6 inch - or more of facial area. (ASTM C242).
- 8. Sanded Cement Grout: Factory prepared mixture of cement, graded sand, and other ingredients to produce water-resistant, dense, uniformly colored material. Used for joints of **1/8 inch (3 mm)** width or greater.
- 9. Static Coefficient of Friction (SCOF): Measures ratio of forces necessary to start two surfaces sliding (older measurement of friction replaced by dynamic coefficient of friction (DCOF)).
- 10. Unsanded Cement Grout: Factory prepared mixture of cement and additives that provide water retentivity. Used for joints of **1/8 inch (3 mm)** or less.

C. Reference Standard:

- 1. American National Standards Institute:
 - a. ANSI A108/A118/A136.1, 'American National Standards Specifications for the Installation of Ceramic Tile', Version 2013.1 (compilation of standards):
 - 1) Installation Standards:
 - a) A108.01, 'General Requirements: Subsurfaces and Preparation by Other Trades'.
 - b) A108.02, 'General Requirements: Materials, Environmental, and Workmanship'.
 - c) A108.05, 'Installation of Ceramic Tile with Dry-Set Portland Cement Mortar of Latex-Portland Cement Mortar'.
 - d) A108.6, 'Installation of Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy'.
 - e) A108.10, 'Installation of Grout in Tilework'.
 - f) A108.17, 'Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone'.
 - 2) Material Specifications:
 - a) A118.1, 'Dry-Set Portland Cement Mortar'.
 - b) A118.3, 'Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive'.
 - c) A118.4, 'Latex Portland Cement Mortar'.
 - d) A118.6, 'Cement Grouts for Tile Installation'.
 - e) A118.7, 'High-Performance Polymer Modified Latex/Portland Cement Grouts for Tile Installation'.
 - f) A118.10, 'Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations'.
 - g) A118.12, 'Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installations'.
 - b. ANSI A137.1, 'National Standard Specifications for Ceramic Tile'.
- 2. ASTM International:
 - a. ASTM A1064/A1064M-16a, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.
 - b. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar'.
 - c. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
 - d. ASTM C206-14, 'Standard Specification for Finishing Hydrated Lime'.
 - e. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
 - f. ASTM C242-15, 'Standard Terminology of Ceramic Whitewares and Related Products'.
 - g. ASTM C373-16, 'Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products'.
 - h. ASTM C482--02(2014), 'Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste'.
 - i. ASTM C501-84(2015), 'Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser'.
 - j. ASTM C648-04(2014), 'Standard Test Method for Breaking Strength of Ceramic Tile'.

- k. ASTM C847-14a, 'Standard Specification for Metal Lath'.
3. International Organization for Standardization:
 - a. ISO 13007-1-2013, ' Ceramic tiles - Grouts and adhesives - Part 1: Terms, definitions and specifications for adhesives'.
 - b. ISO 13007-2-2013, ' Ceramic tiles - Grouts and adhesives - Part 2: Test methods for adhesives'.
 - c. ISO 13007-3-2013, ' Ceramic tiles - Grouts and adhesives - Part 3: Terms, definitions and specifications for grouts'.
 - d. ISO 13007-4-2013, ' Ceramic tiles - Grouts and adhesives - Part 4: Test methods for grouts'.
4. Tile Council of North America:
 - a. TCNA F111-15, 'On-Ground or Above-Ground Concrete, Unbonded Mortar Bed, Ceramic Tile'.
 - b. TCNA F115-15, 'On-Ground Concrete, Ceramic Tile, Epoxy or Furan Grout'.
 - c. TCNA W244c-15, 'Wood or Metal Studs, Cement Backer Board, Ceramic Tile'.
 - d. TCNA W245-15, 'Wood or Metal Studs, Coated Glass Mat Water-Resistant Gypsum Backer Board, Ceramic Tile'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 1. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review installation scheduling, coordination with related work, and placement of tile.
 - b. Review Manufacturer's installation requirements, submittals, and Installers requirements to assure issuance of Manufacturer's system warranty.
 - c. Review surface preparation.
 - d. Review water-proofing and crack isolation membrane requirements.
 - e. Review tile base installation requirements.
 - f. Review floor tile grout thickness requirements.

1.4 SUBMITTALS

- A. Action Submittals:
 1. Samples:
 - a. **24 inch (600 mm)** square sample on specified tile backer showing all types of tile, grout, and colors specified in this Section. 1/2 of sample board shall show floor tile and 1/2 shall show wall tile.
 - b. One sample of each type of base tile and trim piece to be used on Project.
- B. Informational Submittals:
 1. Certificates:
 - a. Master grade certificate.
 - 1) Conform to ANSI A137.1.
 2. Manufacturer's Instructions:
 - a. Provide instructions for installation of tile-setting materials.
 3. Source Quality Control Submittals:
 - a. Provide Manufacturer documentation indicating proposed materials will satisfy requirements for Manufacturer's Warranty.
 4. Qualification Statement. See Section 01 4301 for qualifications:
 - 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) Cleaning and maintenance instructions.
 - b. Warranty Documentation:
 - 1) Include copy of final, executed warranty.

- c. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Source Quality Control Submittal documentation showing materials will satisfy requirements for Manufacturer's Warranty.
 - b) Manufacturer's cut sheets of materials used in installed system.
 - c) Tile color and pattern selections.

1.5 QUALITY ASSURANCE

- A. Source Of Materials:
 - 1. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting materials for Manufacture's system warranty.
- B. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum three (3) years' experience installing specified tile installations.
 - b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding.
 - c. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Deliver and store packaged materials in their original unopened containers with labels intact until time of use.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in a manner to prevent damage or contamination by water, freezing, or foreign matter.
 - 2. Keep grade seals intact and cartons dry until tile are used.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Do not apply tile setting materials to surfaces that contain frost.
 - 2. Keep ambient temperatures of area to receive tile work and surface temperatures of substrates at **50 deg F (10 deg C)** minimum during preparation of mortar bed, laying of tile, and for seventy-two (72) hours after completion of tile work. Use electric heat to prevent discoloration of grout.
 - 3. Temperature of substrate shall be **60 deg F (15.6 deg C)** and rising for application of epoxy and furan unless otherwise specifically authorized by Manufacturer.
 - 4. Maintain epoxy at stable temperature between **60 deg F (15.6 deg C)** and **90 deg F (32 deg C)** during curing period.

1.8 WARRANTY

- A. Manufacturer Warranty:
 - 1. Mortar Manufacturer's twenty-five (25) year minimum system warranty on tile-setting materials for surface preparation, setting materials and grouting materials; includes replacement of defective materials and deterioration, including replacement of tile and labor and materials when products purchased are used within their shelf life and installed in accordance to Manufacturers written instructions and industry standard guidelines.

PART 2 - PRODUCTS**2.1 SYSTEMS****A. Manufacturers:****1. Manufacturer's Contact List:**

- a. Ardex Engineered Cements, Aliquippa, PA www.ArdexAmericas.com.
 - 1) Contact Information: Don Richards (206) 979-0401
www.Don.richards@ArdexAmericas.com.
- b. Custom Building Products, Seal Beach, CA www.custombuildingproducts.com.
 - 1) Contact Information: John Gallup (206) 718-6024 johng@cbpmail.net.
- c. Dal-Tile Corp., Div. of Mohawk Industries, Dallas, TX www.daltile.com.
- d. Interceramic Inc., Garland, TX www.interceramic.com.
- e. Laticrete International Inc., Bethany, CT www.laticrete.com.
- f. Mapei Americas Headquarters, Deerfield Beach, FL www.mapei.com.
 - 1) Contact Information: Bart A. Wilde (801) 467-2060 www.bwilde@mapei.com.
- g. Merkrete, by Parex USA, Inc., Anaheim, CA www.merkrete.com.
 - 1) Contact Information: Andy Townes (505) 873-1181 andy.townes@parexusa.com.
- h. Schuler Systems L.P., Plattsburgh, NY www.schluter.com.

B. Category Two National Contract Suppliers. See Section 01 6200 for definitions of Categories:**1. Contact following suppliers to procure components of tile assembly:**

- a. Daltile And Stone, Salt Lake City, UT:
 - 1) LDS Project Coordinators:
 - a) Russ Green and Larry McCleary, (801) 487-9901, cell (801) 301 1461, fax (801) 487-0345 larry.mccleary@daltile.com - www.daltileproducts.com or www.daltilegreenworks.com.
- b. Interceramic:
 - 1) LDS Project Coordinators:
 - a) First Contact: Diego Chavez, phone (214) 503-5433, fax (877) 551-1979 dichavez@interceramic.com.
 - b) Second Contact: Jose Valdez, phone (214) 503-5507, fax (877) 551-1979 jvaldez@interceramic.com.

C. Design Criteria:**1. General:**

- a. Paver Tile: Standard grade porcelain tile, solid color throughout, graded in accordance with ANSI A137.1:
 - 1) Cove Base with external and internal corner pieces shall be standard grade.
- b. Ceramic Tile:
 - 1) Tile shall be standard quality, white or off-white body, square or cushion edge, graded in accordance with ANSI A137.1.
 - 2) Square edge, white body, lug type wall tile. Field wall tile shall have two lugs on each edge to assure uniform joint, approximately **0.040 inch (one mm)**.
 - 3) External and internal corner pieces shall be standard grade.

2. Capabilities:**a. Paver Tile:**

- 1) Water Absorption when tested in accordance with ASTM C373: 0.1 to 0.5 percent.
- 2) Abrasive Wear Resistance when tested in accordance with ASTM C501: 275 minimum.
- 3) Breaking Strength when tested in accordance with ASTM C648: 300 lbs minimum.
- 4) Bond Strength when tested in accordance with ASTM C482: 200 psi minimum.
- 5) Coefficient of Friction: 0.42 minimum as measured by DCOF (Dynamic Coefficient of Friction) AcuTest method and requirements as per ANSI A137.1.

D. Description:**1. Paver Tile:****a. Tile Sizes:**

- 1) Finished floor with slope shown on Contract Documents: **8 inches (200 mm)** square:

- a) Cove Base: External and internal corner pieces to match with bull-nosed top:
 - (1) 6 inches by 8 inches (150 mm by 200 mm) with bull-nosed top.
- b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Daltile.
- b. Category Four Approved Colors. See Section 01 6200 for definitions of Categories:
 - 1) CD05 Bianco Alpi by Daltile.
 - 2) Dotti Ivory by Interceramic.
- 2. Ceramic Tile:
 - a. Wall Tile:
 - 1) Walls: 6 inch by 6 inch (150 mm by 150 mm).
 - 2) Category Four Approved Colors. See Section 01 6200 for definitions of Categories:
 - a) Room Walls:
 - (1) 0100 White by Daltile.
 - (2) Bone by Interceramic.
 - b) Accent Color:
 - (1) 0135 Almond by Daltile.
 - (2) Canvas by Interceramic.

E. Materials:

- 1. Paver Tile:
 - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
 - 1) Porcelato Graniti by Daltile.
 - 2) Intertech Unglazed by Interceramic.
- 2. Wall Tile:
 - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
 - 1) Semi-Gloss or Matte by Dal-Tile.
 - 2) IC Brites or Mattes or Bold Tones Series by Interceramics.
- 3. Mortar Bed:
 - a. Portland Cement: Meet requirements of ASTM C150/C150M, Type 1, designation shall appear on bag.
 - b. Hydrated Lime:
 - 1) Meet Requirements of one of following:
 - a) ASTM C206.
 - b) ASTM C207, Type S (designation shall appear on bag).
 - c. Sand: Clean, washed, well-graded, meeting requirements of ASTM C144 with gradation of 100 percent passing No. 8 sieve with not over five (5) percent passing No. 100 sieve.
 - d. Latex Additive; in lieu of all water:
 - 1) Design Criteria:
 - a) Meet material specification requirements of ANSI A118.4 or ANSI 118.11.
 - b) Meet ANSI installation specification requirements of ANSI A108.5.
 - c) Expansion joints complies with TCA method EJ171.
 - 2) Type Two Acceptable Products:
 - a) ARDEX: Ardex E 90 Mortar Admix.
 - b) CUSTOM: Thin-Set Mortar Admix.
 - c) LATICRETE: 4237 Latex Additive with 211 Powder.
 - d) MAPEI: Planicrete AC.
 - e) MERKRETE: 150 Latex Admixture.
- 4. Metal Trim:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Tile / Carpet Junction: Schluter-RENO-AETK.
 - 2) Over Expansion Joints In Slabs: Schluter DILEX-BWS, color G, PG, or HB as selected by Architect.
- 5. Joint Sealants:
 - a. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
 - 1) Ceramic and paver cove base inside corners.
 - 2) Ceramic and paver tile joints.
 - 3) Pavel tile base to paver floor tile joints.
- 6. Backer Board Joint Reinforcing: 2 inch (50 mm) wide glass fiber mesh tape.

7. Tile Setting Products:
- a. Use only products of same Manufacturer to validate warranty, unless otherwise acceptable to Ceramic Tile Supplier.
 - b. Use only products that meet Mortar Manufacturer's twenty five (25) year system warranty requirements.
 - c. Latex-Portland Cement Mortar For Floors:
 - 1) Design Criteria:
 - a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
 - b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and . C2ES1P2 performance requirements for adhesive.
 - 2) Category Four Approved Products. See Section 01 62 00 for definitions of Categories:
 - a) ARDEX: Ardex X77.
 - b) CUSTOM: Megalite Crack Prevention Mortar or FlexBond Premium Crack Prevention Thin-set Mortar (no additives needed).
 - c) LATICRETE: 254 Platinum Thinset.
 - d) MAPEI: Ultraflex 3.
 - e) MERKRETE: 735 Premium Flex.
 - d. Latex/Polymer Modified Portland Cement Mortar For Walls:
 - 1) Design Criteria:
 - a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
 - b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) ARDEX: Ardex X77.
 - b) CUSTOM: Megalite Thin-Set Mortar or FlexBond Fortified Thin-Set Mortar.
 - c) LATICRETE: 254 Platinum Thinset.
 - d) MAPEI: Ultraflex 3.
 - e) MERKRETE: 735 Premium Flex.
 - e. Floor Grout (Epoxy):
 - 1) Design Criteria:
 - a) Meet ANSI material specification requirements of ANSI 118.3.
 - b) Meet ANSI installation specification requirements of ANSI A108.6 and ISO material specification ISO13007 RG.
 - 2) Approved Color:
 - a) ARDEX: 25 Stormy Mist.
 - b) CUSTOM: No. 145 Light Smoke.
 - c) LATICRETE: No. 24 Natural Grey.
 - d) MAPEI: No. 11 Sahara Beige.
 - e) MERKRETE: Pro Epoxy D-153 Buckskin.
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) ARDEX: Ardex WA.
 - b) CUSTOM: CEG-Lite 100% Solids Commercial Epoxy Grout.
 - c) LATICRETE: SpectraLOCK PRO.
 - d) MAPEI: Kerapoxy (sanded).
 - e) MERKRETE: Pro Epoxy.
 - f. Wall Grout (Modified Polymer):
 - 1) Design Criteria:
 - a) Meet ANSI material specification requirements of ANSI A118.6 or ANSI A118.7.
 - b) Meet ANSI installation specification requirements of ANSI 108.10 or ISO material specification ISO13007 C2ES1P2.
 - 2) Color:
 - a) ARDEX: No. 01 Polar White.
 - b) CUSTOM: No. 381 Bright White.
 - c) LATICRETE: No. 44 Bright White.
 - d) MAPEI: No. 00 White.
 - e) MERKRETE: D-11 Snow White.

- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) ARDEX: Ardex FH.
 - b) CUSTOM: PolyBlend Non-Sanded Grout or Prism Color Consistent Grout.
 - c) LATICRETE: 1600 Series Unsanded Dry Set Wall Grout with 1776 Grout Admix Plus additive.
 - d) MAPEI: Keracolor-U Unsanded Polymer-Modified Grout.
 - e) MERKRETE: Non-Sanded ColorGrout, latex modified.
- g. Waterproofing Membrane:
 - 1) Design Criteria:
 - a) Meet ANSI installation specification requirements of ANSI 108.10.
 - b) ANSI installation specification requirements not required.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
 - a) Troweled applied, cement based:
 - (1) ARDEX: Ardex 8+9.
 - (2) MAPEI: Mapelastc 315.
 - b) Liquid applied, latex based:
 - (1) CUSTOM: RedGard Waterproofing or Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
 - (2) LATICRETE: Hydro Ban.
 - (3) MAPEI: Mapelastc AquaDefense.
 - (4) MERKRETE: Hydro-Guard SP-1.
- h. Crack Isolation Membrane:
 - 1) Design Criteria:
 - a) Meet ANSI installation specification requirements of ANSI 118.12.
 - b) ANSI installation specification requirements not required.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
 - a) Flexible, thin, load-bearing, fabric-reinforced:
 - (1) ARDEX: Ardex 8+9 with SK Mesh Tape.
 - (2) CUSTOM: Crack Buster Pro Crack Prevention Mat Underlayment, with Peel & Stick Primer.
 - (3) LATICRETE: Blue 92 Anti-Fracture Membrane.
 - (4) MAPEI: Mapeguard 2, and Primer SM.
 - (5) MERKRETE: Hydro-Guard SP-1.
 - b) Liquid applied, latex based:
 - (1) CUSTOM: RedGard Waterproofing and Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
 - (2) LATICRETE: Hydro Ban.
 - (3) MAPEI: Mapelastc AquaDefense.
 - (4) MERKRETE: Fracture Guard 5000.
- i. Stone Thresholds:
 - 1) Texture and color variation shall be within limits established by Architect's approved sample.
 - 2) Free of defects that would materially impair strength, durability, and appearance.
 - 3) Finish: 80 grit exterior hone.
 - 4) White marble, one (1) piece, 7/8 inch (22 mm) thick by 2 1/2 inches (64 mm) by door opening width. Cross-section to meet handicap accessibility requirements.

F. Mixes:

1. Mortar Beds:

	Portland Cement	Dry Sand	Damp Sand	Hydrated Lime*
Floor Mix	One Part	5 Parts	4 Part	1/10 Part
Wall Mix	One Part	- -	5-1/2 to 7 Parts	1/2 Part

* Optional

PART 3 - EXECUTION:**3.1 INSTALLERS**

A. Acceptable Installers:

1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:

1. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.
2. Verify tile substrate is well cured, dry, clean, and free from oil or waxy films, and curing compounds.
3. Notify Architect in writing if surfaces are not acceptable to install tile:
 - a. Do not lay tile over unsuitable surface.
 - b. Commencing installation constitutes acceptance of surfaces and approval of existing conditions.

3.3 PREPARATION

A. Surface Preparation:

1. Allow concrete to cure for twenty-eight (28) days minimum before application of mortar bed.
2. Repair and clean substrate in accordance with installation standards and manufacturer's instructions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Grounds, anchors, plugs, hangers, door frames, electrical, mechanical, and other work in or behind tile shall be installed before tile work is started.

B. Special Techniques:

1. Install in accordance with following latest TCNA installation methods:
 - a. Flush Concrete Slabs with crack isolation membrane: TCNA F115.
 - b. Mortar Bed on Concrete Slab: TCNA F111 with reinforcing.
 - c. Framed Walls: TCNA W245 with waterproof membrane.
 - d. Tile Cove Base: TCNA Flush style.

C. Tolerances:

1. Plane of Vertical Surfaces:
 - a. **1/8 inch in 8 feet (3 mm in 2.450 meters)** from required plane shall be plumb and true with square corners.
2. Variation In Slab Grade:
 - a. Plus or minus **1/8 inch (3 mm)** in any **10 feet (3.050 m)** of floor slab and distance between high point and low point of slab of **1/2 inch (12.7 mm)**.
 - b. Slab Testing Procedure:
 - 1) Place ends of straightedge on **3/8 inch (10 mm)** high shims.
 - 2) Floor is satisfactory if **1/4 inch (6 mm)** diameter steel rod rolled under straightedge will not touch anywhere along **10 foot (3.050 m)** length and **1/2 inch (12.7 mm)** diameter steel rod will not fit under straightedge anywhere along **10 foot (3.050 m)** length.

D. General:

1. Install tile in pattern indicated:
 - a. Align joints when adjoining tiles on floor, base, walls, and trim are same size.

- b. Adjust to minimize tile cutting and to avoid tile less than half size.
 - c. Center and balance areas of tile if possible.
 2. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption:
 3. Maintain heights of tilework in full courses to nearest obtainable dimension where heights are given in **feet and inches (meters and millimeters)** and are not required to fill vertical spaces exactly.
 4. Install cut tile with cuts on outer edges of field:
 - a. Provide straight cuts that align with adjacent materials.
 - b. When possible, smooth cut edges of tile or use appropriate cutter or wet saw to produce smooth cuts.
 - c. Do not install tile with jagged or flaked edges.
 5. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment:
 - a. Fit tile closely where edges are to be covered by trim, escutcheons, or similar devices.
 6. Provide straight tile joints of uniform width, subject to variance in tolerance allowed in tile size:
 - a. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
 7. Use a beating block and hammer or rubber mallet so faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
 8. Accessories in tilework shall be evenly spaced, properly centered with tile joints, and level, plumb, and true to correct projection.
 9. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- E. Application On Concrete Floor:
 1. On Mortar Bed:
 - a. Apply mortar bed to depth equal to depression in slab minus **1/2 inch (12.7 mm)**.
 - b. Properly cure before installing tile.
 2. Clean substrate surface thoroughly.
 - a. Dampen if very dry, but do not saturate.
 3. Install tile with 100 percent contact with mortar bed.
 - a. Obtaining 100 percent contact may require troweling mortar layer on back of each tile before placing on mortar bed.
 4. Install base by flush method (square or thin-lip method is not acceptable):
 - a. Allow for expansion joint directly above any expansion or control joints in slab.
 5. Insert temporary filler in expansion joints.
- F. Application Of Mortar:
 1. Do not spread more mortar than can be covered within ten (10) to fifteen (15) minutes:
 - a. If 'skinning' occurs, remove mortar and spread fresh material.
 - b. Spread mortar with notches running in one (1) direction, perpendicular to pressing, pushing and pulling of tile during placement.
 2. Install tile before mortar has started initial cure:
 - a. For thin set mortar application, use notch trowel that will achieve the recommended coverage of mortar after tiles have been installed.
 3. Place tile in fresh mortar, press, push and pull tile slightly to achieve as near 100 percent coverage and contact of tile with setting material and substrate as possible:
 - a. Average contact area shall be not less than eighty (80) percent except on exterior or shower installations where contact area shall be ninety-five (95) percent when not less than three (3) tiles or tile assemblies are removed for inspection. The eighty (80) percent or ninety-five (95) percent coverage shall be sufficiently distributed to give full support of the tile.
 - b. Support corners and edges with mortar leaving no hollow corners or edges.
 4. Install so there is **1/8 inch (3 mm)** of mortar between tile and substrate after proper bedding:
 - a. Periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.
 - b. If coverage is found to be insufficient, use a larger size notch trowel.
- G. Application Of Grout:
 1. Firmly set tile before applying grout:
 - a. This requires forty-eight (48) hours minimum.

2. Before grouting:
 - a. Remove all paper and glue from face of mounted tile.
 - b. Remove spacers or ropes before applying grouting:
 3. Mixing Grout:
 - a. Use clean buckets and mixing tools:
 - 1) Use sufficient pressure and flow grout in progressively to avoid air pockets and voids.
 - b. Machine mixing of grout is preferred to assure uniform blend. To prevent trapping air bubbles into prepared grout, use slow speed mixer.
 - c. Slake for fifteen (15) minutes.
 - d. Water or latex additives used for mixing with dry grout shall be measured accurately.
 4. Before grouting entire area, do a test area to assure there will be no permanent staining or discoloration of tile and to verify that excess grout can be easily removed from tile surface:
 - a. If necessary, pre-coat exposed surfaces of tile with a grout release recommended by Grout Manufacturer to facilitate removal of excess grout.
 5. Installing Grout:
 - a. Use caution, when grouting glazed ceramic tiles to prevent scratching or damaging surface of tile.
 - b. Dampen dry joints prior to grouting with sand-portland cement grout, standard sanded cement grout, standard unsanded cement grout, polymer modified sanded tile grout, and polymer modified unsanded tile grout. Do not leave puddles of water in joints before grouting.
 - c. Keep an adequate joint depth open for grouting. Force maximum amount of grout into joints.
 - d. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps
 - 1) Fill joints of cushion edge tile to depth of cushion.
 - 2) Fill joints of square edge tile flush with surface.
 - 3) Fill joint between wall tile and bull-nosed paver tile base with floor grout.
 - e. Install floor tile with grout thickness of **3/16 inch (4.76 mm)** maximum.
 - f. Remove excess grout from surface of tile before it loses its plasticity or begins to set.
 - g. Finished grout shall be uniform in color, smooth, and without voids, pin holes, or low spots.
- H. Curing:
1. Keep installation at **65 to 85 deg F (18 to 30 deg C)** during first eight (8) hours of cure. Shade area completely from sun during this period.
- I. Application of Joint Sealants:
1. Apply joint sealants after grout has cured:
 - a. This requires forty-eight (48) hours minimum.
 2. Before applying sealant:
 - a. Remove spacers or ropes before applying joint sealants.
 - b. Apply backer rod and joint sealants at expansion joints.

3.5 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
1. Correct any work found cracked, chipped, broken, unbounded and otherwise defective or not complying with contract document requirements at no additional cost to the Owner.

3.6 CLEANING

- A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter:
1. If a grout haze or residue remains, use a suitable grout haze remover or cleaner.
 2. Flush surface with clean water before and after cleaning.

3.7 PROTECTION

- A. Close to traffic areas where tile is being set and other tile work being done:
 - 1. Keep closed until tile is firmly set.
 - 2. Before, during, and after grouting, keep area clean, dry, and free from foreign materials and airflow that will interfere with setting and curing of grout.

- B. Newly tiled floors shall not be walked on nor worked on without using kneeling boards or equivalent protection of tiled surface.

- C. After cleaning, provide protective covering and maintain conditions protecting tile work from damage and deterioration:
 - 1. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, cover protective covering with **1/4 inch (6 mm)** hardboard, plywood, or similar material.

END OF SECTION

SECTION 09 5116**ACOUSTICAL TILE CEILINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install acoustical tile on backerboard as described in Contract Documents.
- B. Related Requirements:
1. Section 09 2226: 'Metal Suspension System' for Gypsum Board.
 2. Section 09 2900: 'Gypsum Board'.
 3. Section 09 5116: 'Interior Lighting'.

1.2 REFERENCES

- A. Association Publications:
1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. www.cisca.org.
 - a. '*Ceiling Systems Handbook*': Recommendations for direct hung acoustical tile installation.
 - b. '*Production Guide*': Practical reference for ceiling systems and estimating costs.
- B. Definitions:
1. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
 2. Ceiling Attenuation Class (CAC): Rates ceiling's efficiency as barrier to airborne sound transmission between adjacent closed offices. Shown as minimum value, previously expressed as CSTC (Ceiling Sound Transmission Class). Single-figure rating derived from normalized ceiling attenuation values in accordance with classification ASTM E413, except that resultant rating shall be designated ceiling attenuation class. (Defined in ASTM E1414.) Acoustical unit with high CAC may have low NRC.
 3. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or UL 723.
 4. Flame Spread: The propagation of flame over a surface.
 5. Flame Spread Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.
 6. Light Reflectance (LR): Percentage of light a surface reflected by ceiling surface expressed in decimal form.
 7. Noise Reduction Coefficient (NRC): Average sound absorption coefficient measured at four frequencies: 250, 500, 1,000 and 2,000 Hertz expressed to the nearest integral multiple of 0.05. Rates ability of ceiling or wall panel or other construction to absorb sound. NRC is fraction of sound energy, averaged over all angles of direction and from low to high sound frequencies that is absorbed and not reflected.
 8. Smoke-Developed Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723.
 9. Sound Absorption: Property possessed by materials and objects, including air, of converting sound energy into heat energy. Sound wave reflected by surface always loses part of its energy. Fraction of energy that is not reflected is called sound absorption coefficient of reflecting surface. For instance, if material reflects 80 percent of sound energy, then sound absorption coefficient would be 20 percent (0.20).

10. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ASTM Standard E84 or UL 723.
11. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.

C. Reference Standards:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
 - a. ASHRAE Standard 62.1-2013, 'Ventilation for Acceptable Indoor Air Quality'.
2. ASTM International;
 - a. ASTM D1779-98(2011), 'Standard Specification for Adhesive for Acoustical Materials'.
 - b. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - c. ASTM E795-16, 'Standard Practices for Mounting Test Specimens During Sound Absorption Tests'.
 - d. ASTM E1264-14, 'Standard Classification for Acoustical Ceiling Products'.
 - e. ASTM E1414/E1414-16, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
 - f. ASTM E1477 - 98a(2013), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2015 or latest approved Edition):
 - a. Chapter 8, 'Interior Finishes':
 - 1) Section 803, 'Wall And Ceiling Finishes':
 - a) 803.1.1, 'Interior Wall and Ceiling Finish Materials'.
 - b) 803.1.2, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
4. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2015 Edition).
 - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls' (2015 Edition).
5. Underwriters Laboratories Inc.:
 - a. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building MateriADMINISTRATIVE REQUIREMENTS

D. Pre-Installation Conferences:

1. Participate in pre-installation conference specified in Section 09 2900 to review finish requirements for gypsum wallboard ceilings.
2. Schedule acoustical tile ceiling pre-installation conference after installation of gypsum wallboard but before beginning installation of tile.
3. In addition to items specified in Section 01 3100, review following:
 - a. Verify that tile comes from same dye lot and has same dye lot code.
 - b. Review requirements of acceptable and non-acceptable tile.

1.3 SUBMITTALS

A. Action Submittals:

1. Samples:
 - a. One (1) sample of each variant of specified tile series.

B. Informational Submittals:

1. Certificates:
 - a. Installer(s):
 - 1) Provide each Installer's 'Certificate of Completion - LDS Duratile' from Manufacture showing Name and completion date with bid to be included in closing documents for project.
 - a) Certificate is valid for two (2) years from date printed on Certificate before recertification is required.
2. Test And Evaluation Reports:

- a. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
 3. Manufacturer Installations:
 - a. Published installation recommendations.
 4. Qualification Statement:
 - a. Installer(s):
 - 1) Provide Qualification documentation unless waived by Owner.
- C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Include final, executed copy of warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature on tile and adhesive.
 - b) Color and pattern selection.
 - 2) Installer(s) 'Certificate of Completion - LDS Duratile' submitted at time of bid.
- D. Maintenance Material Submittals:
1. Extra Stock Materials:
 - a. Provide Owner with six (6) cartons of each type of tile with same dye lot code.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Fire-Test-Response Characteristics: As determined by testing identical ceiling tile applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Ceiling tile shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.
 2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of ceiling tile on Project.
 - a. Room Corner Tests:
 - 1) ASTM E84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2) IBC 803.2.1, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 3) NFPA 265: 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 4) UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'.
- B. Qualifications:
1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity including a minimum of three (3) years of experience in glue-up ceiling tile installations and shall have satisfactorily completed glue-up installation(s) within in past three (3) years before bidding.
 - b. Review, understand, and comply Installer Qualifications and submitted 'DuraTile' published installation recommendations provided by Manufacturer:
 - 1) Contact Armstrong CSA customer service center at (800) 442-4212 to obtain and review compliance package on DuraTile prior to bidding.
 - 2) This requirement may be waived by Owner, if Installer has previously complied with Installer Qualification requirements and can document at least two (2) satisfactorily completed projects of comparable size using Armstrong 12 inch x 12 inch (300 mm x 300 mm) ceiling tile for glue-up within past three (3) years prior to bidding.

- 3) Installer shall note complete compliance with Qualification requirements on submitted bid form.
- 4) Submit qualification documentation unless waived by Owner.
- c. Agree to complete and pass 'LDS Duratile Personal Learning Module' (Certificate required for all Installer(s) for Church projects). Certification valid for two (2) years:
 - 1) Go to http://www.armstrongceilings.learnupon.com/users/sign_in.
 - 2) If you are new to site, contact Callyn Paul: e-mail: capaul@armstrongceiling.com, phone (717) 396-2220 to set up a username and password.
 - 3) Click on Dashboard in Upper Right hand Corner and select Catalog.
 - 4) Under Filter Catalog Category (left hand side) click on Personal Learning Module (PLM).
 - 5) Click ENROLL on the LDS Duratile Course.
 - 6) Once enrolled, click START on the course to begin.
 - 7) Watch video and take 10 question Quiz then print out completion certificate.
 - 8) Certificate must be submitted with Bid.
 - 9) Certificate required for all projects and may not be waived by Owner.

1.5 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 where protected from moisture, direct sunlight, surface contamination, and damage.
2. Store acoustic tile in cool, dry location, out of direct sunlight and weather, and at temperatures between **32 deg F (0 deg C)** and **86 deg F (30 deg C)**.
3. Store adhesive on site at installation temperature, between **65 and 90 deg F (18 and 32 deg C)**, for one week before installation.
4. Handle acoustical ceiling tiles carefully to avoid chipping edges or damage. Use no soiled, scratched, or broken material in the Work.

1.6 FIELD CONDITIONS

A. Ambient Conditions:

1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Temperature at time of setting tile shall be **50 deg F (10 deg C)** minimum and **100 deg F (38 deg C)** maximum.

1.7 WARRANTY

A. Manufacturer Warranty:

1. Provide Manufacturer's system warranty for the following:
 - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:

1. Manufacturer Contact List:
2. Contact List:

- a. Armstrong World Industries, Strategic Accounts, Lancaster, PA
www.armstrongceilings.com.
 - 1) For pricing and ordering of tile, contact Sherry Brunt or Beth Rinehart at (800) 442-4212, or Armstrongcsa@armstrongceilings.com.
 - 2) For Strategic Account information, contact Deborah Pickens at (480) 695-9053
dlpickens@armstrongceilings.com.
 - b. Franklin International, Inc., Columbus, OH www.titebond.com.
 - c. USG Inc, Chicago, IL www.usg.com.
- B. Materials:
1. Description:
 - a. Size: **3/4 inch (19 mm)** thick minimum by **12 inches (305 mm)** square.
 - b. Color: White.
 - c. Grid Face: Tile glue-up.
 - d. Surface Finish: Factory-applied.
 - e. Wet-formed high density mineral fiber.
 2. Design Criteria:
 - a. Armstrong:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
 - 2) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 1 (nodular), Pattern E (lightly textured) or Pattern F (heavily textured), Fire Class A.
 - b. USG:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 4 (cast or molded), Pattern D (Fissured), Fire Class A.
 - c. Acoustics:
 - 1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
 - a) NRC rating: 60 minimum.
 - 2) CAC rating:
 - a) Armstrong: 35 minimum.
 - b) USG: 25 minimum.
 - d. Anti Mold / Mildew:
 - 1) Resistance against growth of mold/mildew.
 - e. Durable:
 - 1) Impact-resistant.
 - 2) Scratch-resistant.
 - f. Finish:
 - 1) Abuse-resistant/durable, factory applied vinyl latex paint.
 - g. Fire Performance:
 - 1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
 - h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.
 - i. Light Reflectance (LR): 0.79 minimum.
 - j. VOC Requirements:
 - 1) Armstrong:
 - a) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
 - 2) USG:
 - a) Zero.
 3. Acoustic Tile:
 - a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
 - 1) 'F' Fissured by USG.
- C. Accessories:
1. Adhesive:
 - a. Description:
 - 1) For use on acoustical ceiling tiles.
 - b. Design Criteria:
 - 1) Meet requirements of ASTM D1779.

- 2) Meet NFPA Class A fire rating when tested in accordance with ASTM E84.
- 3) Fast grab and 'no sag' installation.
- 4) Water cleanup.
- 5) Not recommended for use on tiles larger than 12 inch x 12 inch (305 mm x 305 mm).
- c. Type Two Acceptable Products:
 - 1) Titebond No. 2704 Solvent Free Acoustical Ceiling Tile Adhesive by Franklin International.
 - 2) Highest quality of adhesive from manufacturer recommended by Tile Manufacturer as approved by Architect before use. See Section 01 6200.
2. Edge Molding:
 - a. Steel 'U' molding with baked enamel finish.
 - b. Type Two Acceptable Products:
 - 1) US 12 RWS 14 by USG Interiors.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Inspect for defects in backing and support that are not acceptable.
 - a. Examine areas around HVAC diffusers and light fixtures for tile installation problems.
 - b. Examine ceiling for levelness. Cisca 'Code of Practice' requires ceiling to be free of irregularities and be level to within 1/4 inch (6 mm) in 12 foot (305 mm).
 - c. Examine substrate for any problems that will compromise adhesion of ceiling tile.
 2. Notify Architect in writing of unacceptable conditions.
 3. Do not apply ceiling tile until defects in backing and support are corrected.

3.2 PREPARATION

- A. Surface Preparation:
 1. Follow Manufacturer recommendations for surface preparation:
 - a. Substrate must be clean, free of grease and dirt, sound, smooth, even and level before applying tile to surface.
 - 1) Do not install new ceiling tile over old glue globs or bad substrate with any surface finish that is incompatible with tile adhesive.
 - b. Painted Surfaces: Avoid applying tile to newly painted ceiling.
 - c. Materials shall be dry and clean at time of application.

3.3 INSTALLATION

- A. Special Techniques:
 1. Installation shall be in accordance with Manufacturer's recommendations:
 - a. Do not install tile when room temperature exceeds or below recommended ambient conditions.
 - b. Tile is directional tile and must be installed in same direction of pattern running parallel to long dimension of each room.
 - c. Remove loose dust from back of tile and ceiling where adhesive is to be applied.
 - d. Prime 3 inch (75 mm) minimum circle near each corner by buttering very thin coat of adhesive.
 - e. Apply daub of adhesive to each corner. Daubs will be of sufficient size to form a circle 2-1/2 to 3 inches (63 to 75 mm) in diameter and 1/8 to 1/4 inch (3 to 6 mm) thick when tile is pressed firmly in place. Do not apply daubs so far in advance of installation that adhesive skins over.
 - f. Do not bend tile during installation.

2. Tile Layout:
 - a. Lay out tile symmetrically about center lines of room.
 - b. Lay out so tiles at room perimeters are at least 1/2 full tile size.
 - c. Leave tile in true plane with straight, even joints.
 - d. Tile joints shall be straight and in alignment, and exposed surface flush and level.
 - e. Furnish and install specified molding wherever tile has exposed edges or abuts walls, columns, and other vertical surfaces, except at curves of 3 inch (75 mm) radius or smaller.
 - f. Cut around penetrations that are not to receive moldings cleanly with sharp knife and at a slight angle away from cutout.
3. Ceiling mounted items:
 - a. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room and centered on tile centers or tile joints insofar as possible, unless shown otherwise.
 - b. Keep method of locating ceiling mounted items as consistent as possible throughout building.
 - c. Ceiling mounted item location method within each room shall always be consistent.

3.4 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 1. Acoustical Tile. The following have been identified by the Manufacturer as tile defects, should not be installed, and will be replaced at no charge to Owner. Manufacturer will replace any material that does not meet product specifications. Installer to call 1 (800) 442-4212 immediately to report any tile discrepancies:
 - a. Obvious Tile Defects:
 - 1) Gross surface defects or damage.
 - 2) Gross damage to edges and corners.
 - 3) Bevels without paint.
 - b. Size Measurement:
 - 1) Tiles measure 12 inches (305 mm), plus or minus 1/32 inch (0.8 mm), measured across center of two (2) parallel sides.
 - c. Squareness Measurement:
 - 1) Measure two (2) diagonals of an individual ceiling tile.
 - 2) Diagonal measurements need to be within 1/16 inch (1.6 mm) of each other. No more than 1/16 inch (1.6 mm) difference.
 - d. Warp:
 - 1) Tiles specification is plus or minus 0.050 inch (1.27 mm) as measured in the center of tile.
 2. Installer:
 - a. Substrate preparation and installation of ceiling tile not following CISCA Code of Practice will be unacceptable and considered defective and subject to replacement at no cost to Owner.

3.5 ADJUSTING

- A. 'Touch-up' minor abraded surfaces.

3.6 CLEANING

- A. Remove from site debris connected with work of this Section.

END OF SECTION

SECTION 09 6466**WOOD ATHLETIC FLOORING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Wood Athletic Flooring:
 - a. Remove areas of existing hardwood athletic flooring system and install new in areas as required for new construction. See Drawings for areas of work.
 - b. Furnish and install hardwood floors complete with base, thresholds, and other items specified as described in Contract Documents.
 - c. Prepare and finish hardwood flooring system as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1200: 'Multiple Contract Summary'.
 - 2. Section 09 0503: 'Floor Substrate Preparation' for:
 - a. Floor substrate preparation.
 - b. Pre-installation conference for Sections under 09 6000 heading 'Flooring'.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
 - a. ACI 302.2R-06, *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (August 15, 2006).
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM F2170-16b, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.
 - b. ASTM F2420-05(2011), 'Standard Test Method for Determining Relative Humidity on the Surface of Concrete Floor Slabs Using Relative Humidity Probe Measurement and Insulated Hood'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate completion of flooring installation with other trades.
- B. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 09 0503 and held jointly with Section 09 6466 pre-installation conference.
 - 2. Conference may be held at project site or another convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
 - 3. Schedule conference after substrate preparation and ONE (1) week minimum before installation of flooring system.
 - 4. In addition to agenda items specified in Section 01 3100 and Section 09 0503, review following:
 - a. Review Testing Agency testing report of Alkalinity and Concrete Moisture of concrete slab:
 - 1) Follow Testing Agency report regarding Alkalinity and Concrete Moisture of concrete slab as specified in Section 09 0503 'Floor Substrate Preparation'.

- b. Review schedule for installation of wood athletic flooring and coordination with other trades.
 - c. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
 - d. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and flooring installation.
- C. Scheduling:
- 1. Testing Agency to provide testing for Alkalinity and Concrete Moisture of concrete slab as specified in Section 09 0503 'Floor Substrate Preparation'.
 - 2. Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.

1.4 SUBMITTALS

- A. Action Submittals:
- 1. Product Data:
 - a. Wood Athletic Flooring:
 - 1) Manufacturer's literature or cut sheet for flooring system and for finish system.
 - 2) Maintenance instructions.
- B. Informational Submittals:
- 1. Manufacturer Instructions:
 - a. Wood Athletic Flooring:
 - 1) Published installation instructions. Submit before pre-installation conference.
 - 2) Manufacturer's installation verification requirements and schedule.
- 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.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature.
 - 2) Testing Inspection Reports:
 - a) Testing Agency Testing Reports of Alkalinity and Concrete Moisture tests.

1.5 QUALITY ASSURANCE

- A. Testing and Inspection.
- 1. Owner will provide Testing for Alkalinity and Concrete Moisture of concrete slab before installation of flooring:
 - a. See Section 01 1200: 'Multiple Contract Summary'.
 - b. See Section 09 0503: 'Flooring Substrate Preparation' for Field Testing for Alkalinity and Concrete Moisture of concrete slab.
- B. Qualifications: Section 01 4301 applies, but is not limited to following:
- 1. Installer Qualifications:
 - a. Paint Installer:
 - 1) As recommended by Floor Finish Manufacturer.
 - b. Wood Athletic Flooring Installer:
 - 1) Qualified and approved by Manufacturer.
 - 2. Manufacturer Qualifications:
 - a. Not less than five (5) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
 - b. VMR Approved Manufacturers:
 - 1) Approval subject to VMR agreement process approval.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Wood Athletic Flooring:
 - a. Do not deliver wood materials to Project until interior painting and tile work is completed but before pre-installation conference.
- B. Storage And Handling Requirements:
 - 1. Wood Athletic Flooring:
 - a. Store wood materials on premises in area with environmental conditions as specified in Field Conditions to allow acclimation to moisture content that will prevail under environmental conditions under which building will be operated.
 - b. Pile bundled wood materials loosely to allow uniform acclimation.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Building Conditions:
 - a. Conditions inside building shall be brought to levels to be normal at occupancy of building.
 - b. Maintain these conditions from time flooring material is delivered to site to time Certificate of Substantial Completion is signed.
 - c. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
 - 2. Concrete Slab:
 - a. General:
 - 1) Final determination as to whether or not a concrete slab is dry enough for flooring installation should be based on evaluating both Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) testing as specified in Section 09 0503 'Floor Substrate Preparation'.
 - b. Alkalinity:
 - 1) Do not install wood flooring if alkalinity of concrete surface exceeds pH level 9. Corrective procedures are required.
 - c. Concrete Moisture Vapor Emission Rate (MVER):
 - 1) Testing conditions inside building shall be brought to same ambient temperature and relative humidity levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
 - 2) Follow requirements specified in Section 09 0503 'Floor Substrate Preparation' before installation of wood flooring.

1.8 WARRANTY

- A. Manufacturer Warranty:
 - 1. Wood Athletic Flooring:
 - a. Flooring Company's two year written guarantee covering labor and materials:
 - 1) Follow Manufacturer's verification procedures of installation conditions necessary for issuance of warranty.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturer:
 - 1. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories.
 - a. Duracushion by Connor Sports Flooring Corp, Phoenix, AZ Jon Isaacs (800) 283-9522 FAX 847-290-9034, e-mail jisaacs@connorfloor.com..

- b. Bio-Cushion by Robbins Sports Surfaces, Cincinnati, OH Todd Goodridge (800) 543 1913 ext 5933 FAX 513-871-7998, e-mail toddg@robbinsfloor.com.
- B. Product:
1. Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a. Connor Sports Flooring:
 - 1) Northern Hard Maple in random lengths.
 - b. Robbins Sports Surfaces:
 - 1) Northern Hard Maple in random lengths or continuous strip XL.
- C. Components:
1. Resilient Pads: 2-1/4 inches (57 mm) wide by 3 inches (75 mm) long by 3/8 inch (9 mm) thick PVC pads with slots or air cells.
 2. Subfloor Plywood: Four-ply minimum, APA graded and stamped, 15/32 inch (12 mm) CDX plywood.
 3. Finish Flooring:
 - a. Hardwood: Match existing species, grade, size, and attachment method.
 4. Base: Match existing base.
 5. Threshold Plate: 5 inches (125 mm) wide by 1/4 inch (6 mm) thick aluminum, fluted on top, slightly tapered both edges in finish selected by Architect.
 6. Finish:
 - a. Sealer: As recommended by Top Coat Manufacturer.
 - b. Top Coats:
 - 1) Description:
 - a) High gloss, high solids, oil-modified urethane or water based finishes.
 - 2) Oil Modified Urethane:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Standard finish:
 - (a) Polyurethane 450 or Polyurethane 500 by Sealed Air Diversey Care, Sturtevant, WI www.diverseycare.com/woodcare.
 - (b) 450 Gym Finish or Gold Medalist 40 Gym Finish by Hillyard Industries, St. Joseph, MO www.hillyard.com.
 - (2) Oil Modified Low VOC one coat products (for Sustainable Design Requirements and/or low odor) Finish:
 - (a) Polyurethane 275 One Coat Finish by Sealed Air Diversey Care, Sturtevant, WI www.diverseycare.com/woodcare.
 - (b) 275 Gym Finish by Hillyard Industries, St. Joseph, MO www.hillyard.com.
 - 3) Water Based (for Sustainable Design Requirements and/or low odor) Finish:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Ultra Low Odor Waterbased Finish (Waterborne Finish Crosslinker additive is not allowed to be used) by Sealed Air Diversey Care, Sturtevant, WI www.diverseycare.com/woodcare.
 - (2) 1907 / Basecoat Gym Finish by Hillyard Industries, St. Joseph, MO www.hillyard.com.
 - (3) ICON Finish with Star Sealer (when needed) by Hillyard Industries, St. Joseph, MO www.hillyard.com.
 - c. Game Lines:
 - 1) No changes to existing game lines.
 7. Adhesives:
 - a. VOC Content:
 - 1) Manufacturer's standard for application indicated that has VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Follow Flooring Manufacturer's prescribed inspection procedure for determining acceptability of installation conditions, including environmental conditions in building during and after installation, moisture content of slab, flatness and levelness of slab, etc.
2. Verify concrete surfaces are sufficiently cured and moisture content is within acceptable levels before beginning installation.
3. Verify ventilation requirements as specified in Field Conditions in Part 1 of this specification have been maintained before proceeding with applying wood floor finish.

B. Evaluation And Assessment:

1. Wood Athletic Flooring:
 - a. Verify before installing aluminum angle base, location of framing member base plate or vertical framing member if attachment to framing member base plate is not feasible.

3.2 PREPARATION

A. Surface Preparation:

1. Correct deficiencies identified during Pre-Installation Conference and confirm acceptance and approval of substrate with Architect before beginning installation of flooring system.
2. Concrete floor slab patching:
 - a. Cracks, chips and joints must be properly patched or repaired.
3. Concrete surface cured, clean, dry, and free of foreign substances that will compromise flooring installation.
 - a. Removal of curing compounds.
 - b. Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
 - c. Removal of overspray from painted walls (essential so glue will stick).
4. Moisture vapor emission tests and alkalinity test of concrete slab has been performed.
5. Vacuum and damp mop floor areas to receive flooring before flooring installation.

3.3 INSTALLATION

- #### A. Do not install wood flooring until interior 'wet type' systems are dried out and overhead trades have completed work in wood floor areas.

B. Cushioned Panels:

1. Place 32 resilient pads on under-side of first layer of plywood **6 inches (150 mm)** in from edges of plywood and **12 inches (300 mm)** on center each way.
2. Lay plywood parallel to short dimension of room with **1/4 inch (6 mm)** spacing at joints.
3. Place second layer of plywood on diagonal with first layer, with **1/4 inch (6 mm)** joints, and secure by screwing, nailing, or stapling, as acceptable to Flooring Manufacturer, at **12 inches (300 mm)** on center.
4. Expansion Provisions:
 - a. Leave **1-1/2 inches (38 mm)** gap between flooring and walls for expansion at perimeters.

C. Laying And Power Nailing of Finish Flooring:

1. Lay flooring parallel to long dimension of room.
2. Tightly drive end joints and properly fit side joints to meet requirements of Manufacturer to meet humidity requirements.
3. Machine nail.

D. Aluminum Threshold:

1. Neatly and substantially anchor aluminum threshold plates located across expansion gaps at door and other floor surface openings with permanent type rust proof anchors. Do not fasten to wood floor.
2. Do not lag fixtures, equipment, plates, outlet boxes, or other items through subfloor to floor unless adequate provision is made for expansion.

E. Sanding Sequence:

1. Make sure floor is free of moisture.
2. Sweep floors clean.
3. Sand with heavy, power driven type sander. Use dust accumulator on machine.
4. Begin sanding with No. 36 or No. 40 grit sandpaper. Sand on diagonal if required to level boards.
5. Proceed with medium grit, 50 or 60 grit sandpaper. Perform this sanding and subsequent sanding passes in direction of grain of floor.
6. Sand edges with No. 60 or 80 grit spinner paper.
7. Sand entire floor with No.80 or 100 grit sandpaper.
8. Disk and entire floor with No. 100 disk paper. Finish with 120 screens.
9. Scrape and hand-sand corners and other areas not reached by machine.

F. Finishing:

1. Allow for adequate ventilation to insure proper curing.
2. Apply two (2) coats of sealer at rate and instructions recommended by Finish Manufacturer. Vacuum, screen and tack between coats as recommended by Finish Manufacturer. (Note: solvent based sealer is preferred were feasible).
3. Proper screening, vacuuming and tacking procedures should be followed at each stage of finishing process.
4. Apply game lines.
5. Apply top coats with ample time between coats for material to properly dry before applying additional coats:
 - a. Coverage per gallon (liter) shall be at rate and number of coats recommended by Finish Manufacture (Typically two (2) coats unless using high solids high performance products).
 - b. Top coats can consist of additional sealer or lower solids product followed with final high solids or high performance top coat.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. See Section 09 0503 'Flooring Substrate Preparation' for Field Testing for Alkalinity and Concrete Moisture of concrete slab.

3.5 CLEANING

A. Waste Management:

1. Installer's Responsibility:
 - a. All work areas are to be kept clean, clear and free of debris at all times.
 - b. Disposal of rubbish in provided dumpster(s).
2. Contractor's Responsibility:
 - a. Provide adequate waste receptacles (dumpsters) and dispose of Owner Furnished materials from building and property as specified in Section 01 7400.

3.6 PROTECTION

A. Contractor's Responsibility:

1. Protect flooring from abuse, vandalism, contaminants, or damage occurring after installation is complete.
2. Protect floor finish until Substantial Completion.
3. Keep floor free of traffic for seventy-two (72) hours minimum after application of final coat.

END OF SECTION

SECTION 09 6816**SHEET CARPETING: Back Cushion, Direct Glue****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But Is Not Limited To:
1. Coordination, sequencing, and scheduling installation of Owner-Furnished carpet, carpet base, carpet accessories, leveling compounds as described in Contract Documents and including following:
 - a. Pre-Installation Conference held in conjunction with Section 09 6813.
 - b. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
 - c. Protection of carpet after installation of carpeting as required.
- B. Related Requirements:
1. Section 01 1200: 'Multiple Contract Summary' for carpet and carpet base excluded from Contract and furnished and installed by Owner. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.
 2. Section 09 0503: 'Flooring Substrate Preparation' for:
 - a. Floor substrate preparation.
 - b. Removal of furniture.
 - c. Pre-installation conference for Sections under 09 6000 heading 'Flooring'.

1.2 REFERENCES

- A. Association Publications:
1. The Carpet and Rug Institute (CRI), Dalton, GA www.carpet-rug.org. Standard for Installation Specification of Commercial Carpet:
 - a. CRI Indoor Air Quality (IAQ):
 - 1) CRI Green Label Plus Certification.
- B. Reference Standards:
1. The Carpet and Rug Institute (CRI):
 - a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
 - b. CRI TM-102, 'School Carpet Minimum Average Specifications'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate completion of carpet installation with other trades.
- B. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference as specified in Section 09 0503.
 2. Schedule pre-installation conference before installation of flooring system.
 3. Conference may be held at project site or another convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
 4. Schedule conference after substrate preparation and ONE (1) week before installation of flooring system.
 5. In addition to agenda items specified Section 01 3100 and Section 09 0503, review following:
 - a. Review Owner's Representative schedule for furnishing and installation carpet.

- b. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
 - c. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
 - d. Removal of furniture.
 - e. Review cleaning and disposal requirements.
 - f. Review protection requirements of carpet after installation of carpeting.
- C. Scheduling:
1. Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.
 2. Notify Owner's Representative to coordinate installation of carpet.

1.4 SUBMITTALS

- A. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Copy of Warranty.
 - b. Record Documentation:
 - 1) Owner will provide Project Carpet Request Documentation forms in both hard copy and digital format:
 - a) Carpet Request Information Sheet.
 - b) Carpet Vendor Quotation.
 - c) Carpet Preinstallation Meeting Agenda.
 - d) Carpet Installation Notice to Proceed or Cancel.
 - e) Carpet Inspection and Completion.
 - f) Carpet Overage Report and Completion.
 - g) Carpet Quotation Change Request.
- B. Maintenance Material Submittals:
1. Extra Stock Materials:
 - a. Leave excess pieces of carpet, **6 feet square (1 800 sq mm)** or larger and **25 lineal feet (7.620 m)** minimum of carpet cove base.
 - b. Roll up and tie securely.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
 2. Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.
- B. Qualifications: Section 01 4301 applies, but is not limited to following:
1. Carpet Installer Qualifications:
 - a. Certified CFI Master or Contract II grade installer or FCIB certified.
 - b. Not less than five (5) years of experience in installation of commercial carpet tile of type, quantity and installation methods similar to work of this section.
 - c. Qualified and approved by Carpet Manufacturer.
 2. Carpet Manufacturer Qualifications:
 - a. Not less than five (5) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
 - b. VMR Approved Carpet Manufacturers:
 - 1) Approval subject to VMR agreement process approval.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General:
 - 1. Comply with instructions and recommendations of Manufacturer for special delivery, storage, and handling requirements.
- B. Delivery And Acceptance Requirements:
 - 1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
 - 2. Do not deliver materials before date scheduled for installation.
 - 3. Transport carpet in manner that prevents damage and distortion. Bending or folding individual carpet rolls or cuts from rolls is not recommended. When bending or folding is unavoidable for delivery purposes, carpet is required to be unrolled and allowed to lie flat immediately upon arrival at installation site.
- C. Storage And Handling Requirements:
 - 1. Store carpet and related materials in a climate-controlled, dry space.
 - 2. Protect carpet from soil, dust, moisture and other contaminants and store on a flat surface.
 - 3. Stacking heavy objects on top of carpet rolls or stacking more than three rolls is prohibited.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Building Conditions:
 - a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning. (HVAC must be in operation thru out carpet installation):
 - 1) Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty-eight (48) hours before, during and seventy-two (72) hours after completion:
 - a) Carpet is to be installed when indoor temperature is between 65° - 95° F (18° - 35° C) with maximum relative humidity of 65%.
 - b) Substrate surface temperature should not be less than 65° F (18° C) at time of installation.
 - c) Do not allow temperature of indoor carpeted areas to fall below 50° F (10° C), regardless of age of installation.
 - 2) Maintain fresh air ventilation after installation for seventy-two (72) hours minimum or until lingering odors are gone.
 - 2. Concrete Slab:
 - a. General:
 - 1) Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive.

1.8 WARRANTY

- A. Manufacturer Warranty:
 - 1. Provide Carpet Manufacturer's standard Warranty which includes following:
 - a. Warranty shall cover defects in installation, workmanship, and installation materials.
 - b. Warranty includes specific workmanship warranties for delamination, edge raveling, fuzzing, pilling, and other textural changes which can be controlled through proper manufacturing (no fraying, zippering, delamination, edge raveling, fuzzing, pilling in carpet is acceptable for any reason).
 - c. Warranty terms will include inspection of defective area within fifteen (15) days of receipt of written notice from Owner and completion of corrective work within forty-five (45) days, unless other arrangements are made in writing with Owner on case-by-case basis.
 - d. Carpet defect or installation defect:

- 1) Carpet Manufacturer may use any reasonable means to cure first three (3) breaches of warranty affecting an area of carpeting bounded by natural breaks such as doorways, stairs, rostrum and platform ('affected carpet area'). Such cure must preserve as uniform a blended appearance, acceptable to Carpet Manufacturer and Owner, as exists throughout Installation Site at time of breach.
- 2) If carpet defect or installation defect continues to appear after three (3) separate notices for correction from Owner, replace carpet where defects have occurred.
- e. If Carpet Manufacturer follows installation requirements of Section 09 0503 'Floor Substrate Preparation' Carpet Manufacture accepts liability of carpet installation for said given time as outlined in Special Warranty regardless of any climate or condition changes affecting RH levels of floor substrate.
2. Special Warranty:
 - a. Sheet Carpeting:
 - 1) General:
 - a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.
 - 2) Meetinghouse, Mission Office, and O&M / R&I:
 - a) Owner Carpet Program Product: Provide twenty (20) year minimum or Carpet Manufacturer's better Warranty on carpet system.
 - 3) CES, S&I Module, and O&M / R&I:
 - a) Institute:
 - (1) Owner Carpet Program Product: Provide twenty-five (25) year minimum or Carpet Manufacturer's better Warranty on carpet system.
 - b) Seminary:
 - (1) Owner Carpet Program Product: Provide twenty-five (25) year minimum or Carpet Manufacturer's better Warranty on carpet system.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

- A. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories:
 1. Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer:
 - a. Lees, Division of Mohawk Carpets, Glasgow, VA:
 - 1) Contact Information: Help Line (800) 523-5555 or (801) 397-5626.
 - b. Mannington Commercial Carpets, Calhoun, GA:
 - 1) Contact Information: Help Line Voice Mail (800) 241-2262, ext 8045 or Mannington Installation Services, email lds@mannington.com or (855) 466-2664.
 - c. Tandus Centiva: Dalton, GA www.tandus-centiva.com.
 - 1) Contact Information: Tracy Riddle - cell (801) 580-5147 fax (866) 861-7522
Tracy.Riddle@Tarkett.com.
- B. Materials:
 1. Carpet:
 - a. Category Four Approved Manufacturer and Interior Color Scheme. See Section 01 6200 for definitions of Categories:
 - 1) Match existing carpet manufacturer and color.
 2. Carpet Base:
 - a. 4-1/2 inch (115 mm) wide base without cushion backing:
 - 1) Top edge of base serged with 1-1/4 inch (32 mm) polyester binding fabric.
 - 2) Roll edges of binding fabric under and sew along top edge of carpet cove base.
 - b. Carpet:
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Mannington: APLDS (LDS Base) - Ultrabac RE, Color: Black.
 - b) Bigelow Commercial (Mohawk): Spectrum V30, Color: 7234 Ebony Domino.
 - c) Tandus Centiva: Abrasive Action II, Color: Winter Gray 19103.

2.2 ACCESSORIES

- A. Carpet Accessories: Snap-in vinyl reducer strips and vinyl track.
- B. Floor Leveling Compound, Floor Patching Compound, And Latex Underlayment: As recommended and approved by Carpet Manufacturer.

PART 3 - EXECUTION

3.1 APPROVED INSTALLER

3.2 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify required ambient conditions inside building for required normal levels of humidity, lighting, heating, and air conditioning have been maintained for at least forty-eight (48) hours before and during carpet installation and seventy-two (72) after installation of carpet.
- B. Evaluation And Assessment:
 - 1. Carpet Areas:
 - a. Variation In Grade:
 - 1) Plus or minus **1/8 inch (3 mm)** in any **10 foot (3 meter)** of floor slab and distance between high point and low point of slab of **1/2 inch (13 mm)**.
 - b. Testing Procedure:
 - 1) Place ends of straightedge on **3/8 inch (10 mm)** high shims.
 - 2) Floor is satisfactory if **1/4 inch (6 mm)** diameter steel rod rolled under straightedge will not touch anywhere along **10 foot (3 meter)** length and **1/2 inch (13 mm)** diameter steel rod will not fit under straightedge anywhere along **10 foot (3 meter)** length.
 - c. Notify Owner's Representative in writing if floor surface is not acceptable to install carpet:
 - 1) Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

3.3 PREPARATION

- A. Furniture Removal:
 - 1. Remove existing furniture and store during construction.
 - 2. Protect stored furniture items from dust, dirt, and damage related to other installation activities.
- B. Carpet Areas:
 - 1. Flooring Preparation:
 - a. Owner-Furnished Product Supplier's Responsibility:
 - 1) Prepare floor substrate in accordance with 'CRI Carpet Installation Standard' best practices to receive carpet installation and to provide installation that meets warranty requirements.
 - 2) Verify concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or installation.
 - b. Concrete floor slab patching:
 - 1) Cracks, chips and joints must be properly patched or repaired.
 - c. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations:
 - 1) Removal of curing compounds.
 - 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
 - 3) Removal of overspray from painted walls (essential so glue will stick).
 - d. Vacuum and damp mop floor areas to receive flooring before flooring installation.

2. Relaxing / Conditioning Carpet:
 - a. Highly recommended that carpet be unrolled and allowed to relax in installation area for time period that conforms to requirements of manufacturer of product being installed:
 - b. Protect carpet adequately from soil, dust, moisture and other contaminants.
 - c. Sundry items, such as adhesives, should also be conditioned.
3. Carpet Accessories:
 - a. Owner-Furnished Product's Responsibility:
 - 1) Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.4 INSTALLATION

- A. Carpet:
 1. General:
 - a. Install carpet and carpet base in accordance with 'CRI Carpet Installation Standard' and Manufacturer's written instructions supplied with product.
 - b. Adhesion of carpet cushion (or secondary backing) to floor substrate and adhesion of carpet primary and secondary backings shall be continuous on floor surface so there are no bubble, ridges, or any separation of carpet from backings or backing from floor substrate caused by failure of carpet, backings or cushion, and adhesives as a system.
 - c. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.
 2. Seaming Requirements:
 - a. Seal seams in accordance with Carpet Manufacturer's instructions and according to CRI Carpet Installation Standard (2009) as applicable. Seam carpet base only at inside corners.
 - b. No seam separation in carpet and no more observable seams from any standing position than that which is unavoidable using best seaming materials and practices available at time of installation.
 - c. Lay rooms parallel to respective Corridors. Seam to permit best use of available carpet.
 - d. Quarter turning allowed only at cross-Corridors longer than **24 feet (7.315 m)**.
 - e. Use single or double seams at doorways (single seams preferred). Run nap of pieced carpet in same direction.
- B. Carpet Base:
 1. Precut base so seams occur only at inside corners.
 2. Scribe base to floor.
 3. Spread adhesive over back side of base up to bottom of serging on edge or apply three **3/16 inch (4.76 mm)** minimum diameter beads of adhesive placed one inch apart on back of base with top bead placed **2 inch (50 mm)** down from serged edge of base and spread adhesive over back surface of base up to bottom edge of serging.
 - a. Bird's mouth finish should only be required when door frame is flush with wall.
 - b. If bird's mouth is required, terminate at door frames or vertical trim with 45 degree angle, bird mouth cut so serged edge turns down to contact frame or trim.
 4. Do not allow adhesive beyond edge of base. Remove excess adhesive.
 5. Do not use staples, nails, screws or other mechanical fasteners.
 6. Set carpet base on brick walls at height either above or below horizontal mortar joint line.

3.5 FIELD QUALITY CONTROL

- A. Field Inspections:
 1. Carpeting:
 - a. Unacceptable carpet after installation shall include but not be limited to:
 - 1) Delaminating carpet from backings.
 - 2) Fiber loss less than specified.
 - 3) Edge raveling.
 - 4) Fuzzing of carpet fibers.
 - 5) Pilling of carpet fibers.

- 6) Appearance retention less than control samples attached to Agreement.
 - 7) Dye bleeding.
 - 8) Zippering fibers in carpet.
 - 9) Color streaking.
 - 10) Irregular tufts of fiber.
- b. Unacceptable workmanship shall include but not be limited to:
- 1) Improper floor preparation before installation.
 - 2) Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
 - 3) Seams that do not comply with specified requirements:
 - a) Raveled or untrimmed seams.
 - b) Seams not sealed, level, straight, or even.
 - c) Open seams.
 - d) Seams visibly open when viewed by Project Manager from standing position.
 - 4) Sequence rolls, commercial match issues created by rolls being installed out of sequence will require correction or replacement.
 - 5) Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
 - 6) Use of unspecified carpet.
 - 7) Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
 - 8) Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
 - 9) Carpet base that is not scribed to fit against floor with no gaps.
 - 10) Carpet base attached by means other than acceptable carpet base adhesive.
- B. Non-Conforming Work:
1. Carpeting:
 - a. Basis of Acceptable Carpeting: Source Quality Control Testing:
 - 1) Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
 - b. Unacceptable Carpeting:
 - 1) Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet. Minimum replacement size shall be:
 - a) Between nearest existing seams.
 - b) Between natural transition points or **12 feet (3.6 meters)** of running length.

3.6 CLEANING

- A. General:
1. Carpeting:
 - a. Carpet Installer's Responsibility:
 - 1) Remove any soiling and/or staining from carpet.
 - 2) Remove excessive adhesive with manufacturer recommended adhesive removers.
- B. Damage to building:
1. Carpeting:
 - a. Carpet Installer's Responsibility:
 - 1) Carpet Installer responsible for cleaning and repair of all damaged surfaces to their original condition from carpet installation.
- C. Waste Management:
1. Contractor's Responsibility:
 - a. Provide adequate waste receptacles (dumpsters) and dispose of Owner Furnished materials from building and property as specified in Section 01 7400.
 2. Carpet Installer's Responsibility:

- a. All work areas are to be kept clean, clear and free of debris at all times.
- b. Disposal of rubbish, wrapping paper, scraps, and trimmings in provided dumpster(s).

3.7 PROTECTION

A. Protection of Carpeting:

1. Contractor's Responsibility:

- a. No traffic of any kind on newly installed carpet for minimum of twenty-four (24) hours after installation is completed.
- b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty-eight (48) hours after completion of carpet installation.
- c. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.
- d. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.

END OF SECTION

SECTION 09 7226**SISAL WALL COVERING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnishing and installing wall covering 'Type A' (Sisal) as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 4512: 'Architectural Woodwork Wood Trim' for wood trim for sisal wall covering.
 - 2. Section 09 2900: 'Gypsum Board' for priming of gypsum board.

1.2 REFERENCES

- A. Definitions:
 - 1. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or UL 723.
 - a. Flame Spread: The propagation of flame over a surface.
 - b. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
 - c. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
 - d. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ASTM Standard E84 or UL 723.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2. International Building Code (IBC) (2015 or latest approved edition):
 - a. Chapter 8, 'Interior Finishes':
 - 1) Section 803, 'Wall And Ceiling Finishes':
 - a) 803.1.3, 'Room Corner Test for Textile Wall Coverings and Expanded Vinyl Wall Coverings'.
 - b) 803.1.4, 'Acceptance Criteria for Textile and Expanded Vinyl Wall Coverings Tested to ASTM E84 or UL 723'.
 - 3. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2015 Edition).
 - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls', (2015 Edition).
 - 4. Underwriters Laboratories, Inc.:
 - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (2010 - Tenth Edition).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature or cut sheet.
 - b. Maintenance instructions.

- c. Color and pattern selection.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
 - 2. 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) Cleaning and maintenance instructions.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature or cut sheets.
 - b) Color and pattern selections.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Wall covering shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.
 - 2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of wall covering on Project.
 - a. Room Corner Tests:
 - 1) ASTM E84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2) IBC 803.1.3, 'Room Corner Test for Textile Wall Coverings and Expanded Vinyl Wall Coverings'.
 - 3) IBC 803.1.4, 'Acceptance Criteria for Textile and Expanded Vinyl Wall Coverings Tested to ASTM E84 or UL 723'.
 - 4) NFPA 265, 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls'.
 - 5) UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'.
- B. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum three (3) years experience in wall covering installations.
 - b. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
 - c. Agree to view 'No-Flame Sisal Wall Covering Recommended Installation Procedures' provided by Owner found on internet in AEC Webpage under Training in Menu tab. Contact Architect for access to video. This requirement may be waived by Owner, if Installer has viewed video before or can document at least two (2) satisfactorily completed projects of comparable size using sisal wall coverings in past three (3) years before bidding.
 - d. Upon request, submit documentation and video verification.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Deliver materials in sealed containers with Manufacturer's labels intact.
- B. Storage And Handling Requirements:
 - 1. Store materials in protected area at temperatures below 90 deg F (32 deg C) and above 50 deg F (10 deg C). Keep from freezing.
 - 2. Keep container tightly closed in well ventilated area, and store upright when not in use.
 - 3. Shelf life: One (1) year minimum - Unopened containers.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Apply when the temperature is between 50 deg F (10 deg C) minimum and 100 deg F (38 deg C) maximum and relative humidity is less than seventy-five (75) percent.
 - 2. Provide good ventilation.

1.7 WARRANTY

- A. Manufacturer Warranty:
 - 1. Provide five (5) year warranty against manufacturing defects.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
 - 1. Design Materials Inc, Kansas City, KS www.dmikc.com.
 - 2. Fibreworks, Louisville, KY www.fibreworks.com.

2.2 DESCRIPTION

- A. Colors:
 - 1. Category Four Approved Colors. See Section 01 6200 for definitions of Categories:
 - a. Match existing color.
 - b. Submit samples of manufacturer's standard colors for selection by the Architect.

2.3 MATERIALS

- A. Sisal Wall Covering:
 - 1. 100 percent fire-treated sisal yarn.
 - 2. 1/4 inch (6 mm) pile height, 48 oz/sq yd (1 627 grams/sq meter) minimum. Sisal to be installed full height on walls shall be furnished in 9 or 13 foot (2.75 or 3.96 meters) wide goods.
 - 3. Reversible weave type, without backing.

2.4 ACCESSORIES

- A. Wall Covering Adhesive:
 - 1. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a. 257 Sisal Adhesive by Fibreworks.
 - b. Sisal Adhesive No. 1-422 by Design Materials.

- B. Seam Cement:
 - 1. Type Two Acceptable Products:
 - a. 8415 Glue-Down Carpet Seam Adhesive by Roberts Consolidated Industries, Div QEP, Henderson, NV www.robertsconsolidated.com.
 - b. Equal as recommended by Wall Covering Manufacturer with approval of Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate and verify that it is suitable for installation of sisal wall covering.
 - 2. Notify Architect of unsuitable conditions in writing.
 - a. Do not install over unsuitable conditions.
 - 3. Commencement of Work by installer is considered acceptance of substrate.

3.3 INSTALLATION

- A. Apply wall covering in accordance with Manufacturer's instructions, available on DVD from Owner through Architect. See Quality Assurance Installer Qualifications as specified in Part 1 of this specification.
- B. Using specified adhesive, glue continuously to surface to be covered with wall covering. Apply adhesive in accordance with Manufacturer's recommendations.
- C. Run 'ribs' in weaving to match existing sisal. Install wall covering so it extends to within **1/8 inch (3 mm)** of floor slab.
- D. Carry sisal around corners approximately **6 inch (152 mm)** making no outside corner cuts.

END OF SECTION

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. Section 09 0162: 'Finishing New Or Sanded Wood Athletic Flooring' for finishing of hardwood flooring and painting of game lines.
 - 3. 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.

D. Maintenance Materials Submittals:**1. Extra Stock Materials:**

- a. Provide painting materials in Manufacturer's original containers and with original labels in each color used. Label each can with color name, mixture instructions, date, and anticipated shelf life.
- b. Provide one (1) quart of each finish coat and one (1) pint of each primer and of each undercoat in each color 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.
3. Notify Architect two working days before delivery of coatings.

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 both interior and 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. Where required to meet LEED (Leadership in Energy and Environmental Design) program requirements, use only MPI listed materials having an "L" rating designation.

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 APPLICATORS

A. Approved Applicators:

1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

3.2 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.

3.3 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. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.
 - c. On existing work where ceiling is to be painted, speakers and grilles are already installed, and ceiling color is not being changed, mask off metal grilles installed on ceiling speakers. If ceiling color is being changed, remove metal grilles and paint, and mask off ceiling speakers.

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.

3.4 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. Finish casework and wood trims that are specified to be installed under Section 06 2001 and that are not called out to be factory-or shop-finished. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
2. Paint inside of chases in occupied spaces flat black for **18 inches (450 mm)** or beyond sightline, whichever is greater.

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. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.

- E. 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.
- F. 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.
- G. Touch up suction spots after application of first finish coat.
- H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.
- I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.
- J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.
- K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.5 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.

3.6 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

ATTACHMENTS**PART 4 - PAINT COLOR SCHEDULE**

A. Related Requirements:

1. Section 09 9122 'Interior Painted CMU or brick'.
2. Section 09 9123 'Interior Painted Gypsum Board-Plaster'.
3. Section 09 9124 'Interior Painted Metal'.
4. Section 09 9125 'Interior Wood Paint'.
5. Section 09 9324 'Interior Clear-Finished Hardwood'.

B. Colors:

1. Interior:

- a. Interior Clear Finished Wood (See Section 09 9324):
 - 1) Match other interior clear finished wood building elements.
- b. Interior CMU or brick (See Section 09 9122):
 - 1) Class One Color Quality Standard. See Section 01 6200:
 - a) Match existing paint color.
- c. Interior Gypsum Board, Plaster (See Section 09 9123):
 - 1) Class One Color Quality Standard. See Section 01 6200:
 - a) Match existing paint color.
- d. Interior Metal (See Section 09 9124):
 - 1) Class One Color Quality Standard. See Section 01 6200:
 - a) Match existing paint color.
- e. Interior Painted Wood (See Section 09 9125):
 - 1) Class One Color Quality Standard. See Section 01 6200:
 - a) Match existing paint color.

SECTION 09 9122**INTERIOR PAINTED CMU and BRICK****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and painting new interior CMU and brick walls as described in Contract Documents.
- 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. Manufacturer:
 - 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 new masonry surfaces to be painted:
 - a. New Surfaces: Use MPI(a) INT 4.2D Latex Finish system.
 - b. Previously Finished Surfaces: Use MPI(r) REX 4.2H Latex Finish system.
 - 2. New Surfaces:
 - a. Use MPI(a) INT 4.2D 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. Block Filler, Over New Masonry Only: MPI Product 4: 'Block Filler, Latex, Interior/Exterior'.
 - 2. Finish Coats: MPI Product 141: 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

- A. General: See appropriate paragraphs of Section 09 9001.
- B. Existing Painted Surfaces:
 - 1. Remove deteriorated existing paint by scraping or sanding. Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
 - 2. Sand areas of existing sound paint if necessary for bonding of new paint system. Clean existing painted surfaces, sanded or not, with mild soap and water, or with tri-sodium phosphate (TSP).
 - 3. Fill large holes with patching and small holes and cracks with spackle.
 - 4. Apply one coat primer to scraped and sanded areas.
 - 5. Apply one finish coat. Completely cover voids in masonry block but do not fill.

END OF SECTION

SECTION 09 9123**INTERIOR PAINTED GYPSUM BOARD, PLASTER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing, priming, and finish painting new interior gypsum board and plaster surfaces as described in Contract Documents.
 - 2. Preparing and painting following existing interior gypsum board and plaster surfaces as described in Contract Documents.
- 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'.
 - b. 'Attachment: Paint Color Schedule' for O&M / R&I Projects.
 - 2. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 2900.
 - a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
 - 1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
 - 2. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers and Products. 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. Rest Rooms:
 - a. New Surfaces: Use MPI(a) INT 9.2F Waterborne Epoxy Finish system.
 - b. Previously Finished Surfaces: Use MPI(r) RIN 9.2E Waterborne Epoxy Finish system.
 - 2. All Other:
 - a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.
 - b. Previously Finished Work: Use MPI(r) RIN 9.2B 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 requirements.
 - d. Gloss / Sheen Required:
 - 1) Rest Rooms: Gloss Level 6.
 - 2) Remaining Painted Surfaces: Gloss Level 5.
- D. Materials:
- 1. Primers:
 - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
 - 2. Finish Coats:
 - a. Rest Rooms:
 - 1) Buildings with only Gypsum Board surfaces in rooms:
 - a) MPI Product 115, 'Epoxy-Modified Latex, Interior, Gloss (MPI Gloss Level 6)'.
 - 2) Buildings with Brick and Gypsum Board surfaces in same rooms:
 - a) MPI Product 77, 'Epoxy, Gloss'.
 - b. Remaining Painted Surfaces:
 - 1) MPI Product 141, 'Latex, Interior, High Performance Architectural, 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. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.
- C. Existing Painted Surfaces:
 - 1. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
 - 2. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
 - 3. Spackle and tape cracks. Sand to smooth finish and spot prime.
 - 4. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
 - 5. Re-clean surface.
 - 6. Apply primer coat.
 - 7. Apply finish coats.

END OF SECTION

SECTION 09 9324**INTERIOR CLEAR-FINISHED HARDWOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and finishing of new interior clear finished hardwood as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 2210: 'Miscellaneous Wood Trim'.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
 - 3. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 4. Section 08 1429: 'Interior Flush Wood Doors'.
 - 5. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - b. 'Attachment': 'Paint Color Schedule' for O&M / R&I Projects.

1.2 REFERENCES

- A. Reference Standards:
 - 1. Kitchen Cabinet Manufacturers Association / American National Standards Institute:
 - a. ANSI/KCMA A161.1-2000 (R2005) 23-Jan-2001 'Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets.'

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
 - a. Review control sample(s).

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Requirements for samples are specified in Related Requirement Sections listed above.
 - b. Design Criteria:
 - 1) Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Before beginning finish work, submit Finish Manufacturer's literature or certification that finish material meets requirements of ANSI / KCMA A161.1.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Design Criteria:
 - a. See appropriate paragraphs of Section 09 9001.
2. Stain: MPI 90, 'Stain, Semi-Transparent, for Interior Wood'.
3. Clear Finish Coats:
 - a. Field Finished:
 - 1) Chemcraft International Inc:
 - a) First, Second, And Third Coats: 20 Sheen Opticlear Pre-Catalyzed Lacquer.
 - 2) ICI Dulux / Trinity:
 - a) First Coat: ICE Vinyl Sanding Sealer.
 - b) Second And Third Coats: ICI Pre-Catalyzed Lacquer.
 - 3) Lilly / Valspar:
 - a) First, Second, And Third Coats: 20 Sheen Pre-Catalyzed Lacquer 587E208.
 - 4) Sherwin-Williams:
 - a) First Coat: T67F3 Vinyl Sealer.
 - b) Second And Third Coats: T77F38 Sherwood Pre-Catalyzed Lacquer DRE.
 - b. Mill Finished: Architectural Woodwork finished in a mill may use one (1) coat of Vinyl Sealer and two (2) coats of Conversion Varnish or three (3) coats of Conversion Varnish from one (1) of the approved Finish Manufacturers, as recommended by Finish Manufacturer.
 - c. Products meeting testing requirements for finishes of ANSI / KCMA A161.1 may be used upon approval of submission by Architect before use. See Section 01 6200.
4. Color:
 - a. Design Criteria:
 - 1) Finish to match Owner selected sample.
 - b. LDS 110.
 - 1) Performance standard: Owner provided sample.
 - a) Contact Information: Nancy Black (801) 240-2431 BlackNL@ldschurch.org, Meetinghouse Facilities Department.

PART 3 - EXECUTION

3.1 APPLICATION

A. General:

1. See appropriate paragraphs of Section 09 9001.
2. Sand entire exposed surface of item to be finished lightly with 120 to 150 non-stearated sandpaper and clean before applying dye or stain.
3. Apply stain in accordance with Manufacturer's recommendations and as necessary to attain correct color.
4. Scuff sand with 220 non-stearated sandpaper between application of application stain and first finish coat.
5. If wood is finished before installation, finish cut ends and other unfinished, exposed surfaces same as previously finished surfaces after installation of wood.

B. Where back-priming is required, apply one coat of finish material.

C. Architectural Woodwork Door Surfaces (cabinetry doors only):

1. Finish tops, bottoms, and edges before faces.
2. Finish architectural woodwork doors with no hardware applied to doors.

END OF SECTION

SECTION 09 9413**INTERIOR TEXTURED FINISHING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and apply texturing on ceilings as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 2900: 'Gypsum Board' for priming.
 - 2. Section 09 9001: 'Common Painting And Coating Requirements' for:
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - 3. Section 09 9123: 'Interior Painted Gypsum Board, Plaster' for finish painting.

1.2 REFERENCES

- A. Definitions:
 - 1. Drywall Texture: Compound rolled, sprayed, or troweled onto sheetrock after taping and floating of joints is complete. Uses same material as joint compound, but thinned down with water and applied to wall surface:
 - a. Light Orange Peel: Sprayed texture leaves light splatter on walls. Resembles peel of orange. If done with fine spray, can be one of the lightest, least noticeable of the texture styles.
 - b. Light Skip Trowel - Texture is applied to ceilings with trowel. Trowel marks may be left on surface to give a rustic, hand crafted look.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
 - a. Review control samples.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. All texture types:
 - 1) Provide minimum of three (3) 24 inch (600 mm) square control samples on primed gypsum wallboard of each distinct existing gypsum board texture in areas of work to show possible variations.

1.5 QUALITY ASSURANCE

- A. Field Samples:
 - 1. Before performing work of this Section, prepare control samples.
 - 2. Architect will inspect control sample at pre-installation conference following preparation of control sample. When sample is approved, work of this Section may proceed. Approved samples will be kept at site at all times work of this section is being performed.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - b. U S Gypsum Co, Chicago, IL www.usg.com.
- B. Materials:
 - 1. Class Two Quality Standards: See Section 01 6200.
 - a. ProForm Perfect Spray EM/HF by National Gypsum.
 - b. Sheetrock Wall & Ceiling Texture by U S Gypsum.

PART 3 - EXECUTION**3.1 APPLICATION**

- A. Location:
 - 1. Ceilings:
 - a. Light Skip Trowel Texture:
 - 1) Match existing ceilings.
 - 2. Walls:
 - a. Match existing walls in adjacent areas.
- B. Finishing:
 - 1. Skip Trowel Texture:
 - a. After gypsum board is taped and sanded, apply texture. Closely match samples accepted by Architect.
 - 1) After wall has been textured, apply priming and paint as specified in Section 09 9123.

END OF SECTION

SECTION 10 1113**FIXED CHALKBOARDS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Installed But Not Furnished Under This Section:
 - 1. Chalkboards and specified hardware: Visual Display Board Type 1.
- B. Related Requirements:
 - 1. Section 01 6400: Owner will furnish Chalkboards. PART 2 of this Section establishes quality of materials for information of Contractor, Architect, and Owner's Representatives.
 - 2. Section 06 1100: 'Wood Framing' for blocking.
 - 3. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Manufacturer Instructions:
 - a. Published installation instructions.
 - b. Printed cleaning instructions.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Maintenance instructions.
 - 2) Printed cleaning instructions.
 - b. Warranty Documentation:
 - 1) Manufacturer Warranty.
 - c. Record Documentation:
 - 1) Manufacturer's documentation:
 - a) Manufacturer's product literature.
 - b) Color selections.

1.3 WARRANTY

- A. Manufacturer Warranty:
 - 1. Letter from Manufacturer certifying Contract Documents have been complied with and guarantee against faulty workmanship and materials for five years.

PART 2 - PRODUCTS**2.1 OWNER-FURNISHED PRODUCTS**

- A. Category Two National Contract Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1. ADP Lemco Corporation, Draper, UT www.adplemco.com.
- B. Fixed Chalkboard:
 - 1. Color: Dark Gray.
 - 2. Mounting Hardware: Suitable for wall conditions.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount boards square and level.
 - 1. Shim as necessary to provide permanent installation and smooth operation.
 - 2. Anchor boards securely to wall following Manufacturer's written installation instructions.
 - 3. Anchor concealed hangers with screws at **24 inches (600 mm)** on center.

- B. Mounting fasteners shall penetrate framing lumber or blocking **1-1/2 inch (38 mm)** minimum. Use toggle bolts or expansion bolts in masonry walls.

- C. After attaching map clips, apply permanently attached end cap or screw to prevent removal of map clips.

END OF SECTION

SECTION 10 2113**METAL TOILET COMPARTMENTS****PART 1 - GENERAL****1.1 SUMMARY**

A. Includes But Not Limited To:

1. Furnish and install metal toilet compartments as described in Contract Documents.

B. Related Requirements:

1. Section 06 1100: 'Wood Framing' for blocking in wood framing for compartment installation, ceiling support for urinal partitions, and door bumper.
2. Section 09 2216: 'Non-Structural Metal Framing' for blocking in non-load-bearing metal framing for compartment installation and door bumper.
3. Section 10 2813: 'Commercial Toilet Accessories'.

1.2 REFERENCES

A. Definitions:

1. Stainless Steel: Stainless steels are alloys of iron to which at least 10 percent chromium has been added to increase corrosion resistance and will not rust when exposed to weather. To obtain greater corrosion resistance, more nickel and chromium are added to the alloy. Along with iron and chromium, all stainless steels contain some carbon to make it stronger.
 - a. Stainless Steel Alloys:
 - 1) Type 304 (UNS S30400): Austenitic stainless steel with non-magnetic properties in annealed condition that provide good corrosion resistance to both chemical and atmospheric exposures, with high resistance to oxidations. Most common and widely used stainless steel.

B. Reference Standards:

1. ASTM International:
 - a. ASTM A167-99(2009), 'Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.'
 - b. ASTM A484/A484M-12, 'Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings'.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Color selection.

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.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheet.
 - b) Color selection.

1.4 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 and handle in compliance with Manufacturer's instructions and recommendations.

1.5 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Type One Acceptable Manufacturers:

1. Flush-Metal Partition Corp, Maspeth, NY www.flushmetal.com.
2. Hadrian Inc, Mentor, OH www.hadrian-inc.com.
3. Equal as Approved by Architect before bidding. See Section 01 6200.

2.2 MANUFACTURED UNITS

A. Toilet And Miscellaneous Partitions:

1. Floor-mounted, overhead-braced.
2. Panels:
 - a. Galvanized bonderized steel sheets (minimum **0.00015 inch (0.004 mm)** zinc coating).
 - b. Edges bound interlocked with drawn molding welded on corners.
 - c. Corners welded and ground smooth.
 - d. Sound deadening honeycomb core.
 - e. Provide wood blocking on all panels that have grab bars.
 - f. Gauge:
 - 1) Doors: **22 ga (0.08 mm)** minimum.
 - 2) Panels: **22 ga (0.08 mm)** minimum.
 - 3) Pilasters: **22 ga (0.08 mm)** minimum.
 - 4) Screens: **22 ga (0.08 mm)** minimum.
3. Doors:
 - a. 34 inches wide and 24 inches wide as shown on Contract Drawings.
4. Posts:
 - a. **20 ga (one mm)** minimum of same construction and finish as panels.
5. Headrails:
 - a. Aluminum.
 - b. **20 ga (one mm)** minimum of same construction and finish as panels.
 - c. Anti-grip design.
6. Plinths:
 - a. **20 ga (one mm)** Type 304 stainless steel, Number 4 finish.
 - b. **3 inch (76 mm)** minimum high, secured with concealed clips.
 - c. All fasteners used to attach Plinths, Posts and Pilasters to the floor shall be Type 304 stainless steel.
7. Anchorages and fasteners:
 - a. Concealed: Non-corrosive, protective finish.
 - b. Tamper resistant Torx Head with pin screws.
8. Hardware:
 - a. Each door:

- 1) Gravity type hinges with double handed, nylon bottom cam, bottom hinge finished flush with door bottom. The hinges shall be permanently set so the door comes to a resting position 3 inches from the fully closed position.
 - 2) Sliding or concealed door bolt with emergency access.
 - 3) Door strike and keeper with rubber bumper.
 - 4) Do not install coat hooks on stall door.
 - 5) Door pull on both sides of every door. Door pulls on opposite sides of doors shall share the same holes and screws in door (the interior door pull has countersunk screw holes).
- b. Finish: Chrome plated.
 - c. Meet requirements of ASTM B86, Alloy AG 40A.

B. Urinal Partition:

1. Basic construction same as panels above, floor and ceiling mounted.
2. Depth of partition from wall to be 24 inches, including the post.
 - a. Partition maximum width shall not encroach into required accessibility clear floor space.

2.3 FINISHES

A. Finish And Color:

1. Powder-coated paint finish.
2. Class One Color Quality Standards. See Section 01 6200.
 - a. Flush-Metal: 63 Off White
 - b. Hadrian: 504 Linen

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Field verify dimensions.
2. Verify that necessary blocking has been installed in framed walls for partition installation and for place where coat hook / door bumper will strike wall.

3.2 INSTALLATION

- A. Install pilasters rigid, plumb, and level. Maintain proper door openings. Anchor pilaster to floor with Type 304 stainless steel fasteners embedded **2 inches (50 mm)** into concrete slab below setting bed.
- B. Secure panels to walls with two stirrup brackets minimum attached near top and bottom of each panel. Use fasteners of length to provide **one inch (25 mm)** embedment into blocking or masonry.
- C. Secure overhead brace to face sheets with two fasteners minimum per face. Set door tops parallel with brace. Set door bottom **12 inches (300 mm)** above floor.
- D. Plinth to be level with and snug to floor.

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 at no additional cost to the Owner.
 2. Replace damaged or severely scratched materials with new materials at no additional cost to the Owner.

3.4 ADJUSTING

- A. Lubricate hardware as recommended by Manufacturer.
- B. Permanently set hinges so the partition doors comes to a resting position 3 inches from the fully closed position.
- C. Perform final adjustments to pilaster leveling devices, door hardware, and other operating parts of partition assembly just before Substantial Completion.

3.5 CLEANING

- A. Remove protective masking. Clean exposed surfaces of partitions, hardware, fittings, and accessories.
- B. Touch-up minor scratches and other finish imperfections using materials and methods recommended by Manufacturer.

END OF SECTION

SECTION 10 2233**ACCORDION FOLDING PARTITIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But Is Not Limited To:
 - 1. Coordination, sequencing, and scheduling of Owner-Furnished accordion folding partition installation as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1200: 'Multiple Contract Summary' for furnishing and installation of accordion folding partitions by Owner. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.
 - 2. Section 06 1100: 'Wood Framing' for folding door header and framing required to receive accordion folding partitions.
 - 3. Section 06 4512: 'Architectural Woodwork Wood Trim' for folding partition hardwood jambs and trim.
 - 4. Section 09 9324: 'Interior Clear-Finished Hardwood' for finishing folding partition hardwood jambs and trim.

1.2 REFERENCES

- A. Definitions:
 - 1. Noise Isolation Class (NIC): Method for rating a partition's ability to block airborne noise transfer.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM E90-09(2016), 'Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements'.
 - b. ASTM E336-16a, 'Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings'.
 - c. ASTM E413-16, 'Classification for Rating Sound Insulation'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate efforts of various trades affected by the Work of this Section.
 - 2. Coordinate completion of folding partition headers.
 - a. Assure accurate installation of folding partition header(s).
 - 3. Coordinate completion of accordion folding partition hardwood jambs and trim.
 - 4. Coordinate completion of accordion folding partition installation with sound system testing so acoustic testing of accordion folding partitions may be performed at same time.
- B. Sequencing:
 - 1. Install accordion folding partitions after following has been completed:
 - a. Folding partition headers and adjacent walls and ceilings are finished and painted.
 - b. Hardwood jambs and trim installed and finished.
 - c. Carpet flooring has been installed.
 - d. If athletic wood flooring is included with Project, flooring has been installed and properly cured which is usually thirty (30) days.

- C. Scheduling:
 - 1. Notify #1:
 - a. Notify Manufacturer when folding partition headers are installed and ready for field measurement.
 - 1) Receipt of Notification shall be eight (8) weeks minimum before start of installation of accordion folding partitions.
 - 2. Notify #2:
 - a. Notify Manufacturer two (2) weeks minimum before scheduled start of installation of accordion folding partitions.
 - 3. Notify #3:
 - a. If schedule has changed since Notify #2, notify Manufacture of new schedule for coordination of delivery and installation of accordion folding partitions.
 - 4. Installation of accordion folding partitions should be completed within fourteen (14) days of commencement.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature or cut sheet.
 - b. Color and style selections.
 - 2. Shop Drawings:
 - a. Show attachment to framing and accordion folding partition header and interface with adjacent Work.
 - b. Show height from finished floor to bottom side of accordion folding partition header.
 - c. Show accordion folding partition installation details and layout.
- B. Informational Submittals:
 - 1. Manufacturer Instruction:
 - a. Manufacturer's accordion folding partition installation details.
 - 2. Manufacturer Reports:
 - a. Provide letter certifying that installation is complete and ready for acoustic testing.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Manufacturer's maintenance instructions.
 - 2) Maintenance and repair box with spare parts.
 - b. Warranty Documentation:
 - 1) Include copy of final, executed warranty / Certificate stating that installed materials comply with specification.
 - c. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature.
 - b) Color selections.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Sound rated partitions shall have laboratory sound rating indicated, when tested in accordance with requirements of ASTM E90.
- B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to the following:
 - 1. Installation shall be performed by Manufacturer trained or authorized personnel according to Manufacturer's installation instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements: Requirements of Section 01 6600 applies, but not limited to the following:
 - 1. General:
 - a. Delivery is preferred to coincide with accordion folding partition installation.
 - 2. Contractor's Responsibility:
 - a. Supervise unloading and handling.
 - 3. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Deliver in Manufacturer's original, unopened package(s).
 - b. Handling and unloading.
 - c. Delivery shall be no more than fourteen (14) days before start of installation of accordion folding partitions.
 - d. Replace damaged materials at no cost to Owner.
- B. Storage And Handling Requirements:
 - 1. Contractor's Responsibility:
 - a. Provide secure location protected from weather and other trades.
 - 2. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Store boxes flat no more than four (4) high.

1.7 WARRANTY

- A. Special Warranty:
 - 1. Manufacturer's covering installation and complete accordion folding partition assembly.
 - a. Warranty covers defects in manufacture and installation of accordion folding partitions, which will not allow them to function for their intended use, for period of five (5) years.
 - b. Warranty covers attachment of internal acoustical barrier for period of five (5) years.
 - c. Warranty covers partition chaining for period of five (5) years for new projects or period of five (5) years for installation of accordion folding partition chaining on existing projects. Warranty does not cover excessive abuse or misuse as determined by Owner and Manufacture.
 - d. Warranty covers adjustment and operation of lead posts for period of five (5) years.
 - e. Provide on-site warranty service within ten (10) days of receiving request and at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

- A. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1. Cornell Iron Works Inc, Mountaintop, PA www.cornelliron.com.
 - a. Acoustic Barrier Partition: TranZform Sound Model ESP20.
- B. Description:
 - 1. Operation:
 - a. All units shall be top supported without use of any floor tracks or single point lock sockets.
 - b. Smooth glide manual push/pull operation is accomplished with ease and minimal force.
 - 2. Track:
 - a. Heavy duty extruded aluminum overhead track capable of being recessed.
 - 3. Panels:
 - a. Corrugated steel panels coated with scratch resistant, permanently bonded decorative vinyl finish.
 - b. Modular construction.
 - 4. Hinges:
 - a. Full height extruded vinyl hinges color matched to wall panels.

5. Radius ends as shown on the Contract Documents.
6. Floating jambs as noted on the Contract Documents.

C. Performance:

1. Design Criteria:

a. General:

- 1) Total accordion folding partition assembly shall be repairable at installed location without removal to repair shop or factory.

b. Acoustic Accordion Folding Partition:

- 1) Completed acoustic accordion folding partition assembly shall have NIC rating of thirty (30) in Chapel and Cultural Center and twenty-four (24) in other areas when tested in accordance with ASTM E336 and calculated in accordance with ASTM E413 and when installed on header configuration and surrounding construction shown on Contract Documents.

c. Color And Pattern Quality Standards:

- 1) Partition color approved for project.
 - a) Submit samples for color selection.
- 2) Safety Sweep Clip: Black.

D. Materials:

1. Acoustic Partitions:

a. Design Criteria:

1) Panels:

- a) 24 ga (0.64 mm) steel.
- b) Exposed surface: Vinyl-clad.
- c) Interior surface: Corrosion protected or coil steel coated.
- d) Panel assembly shall have inner surface continuously covered with acoustical barrier permanently attached to panels.
- e) 2.6 panels per lineal foot (300 mm) minimum for all partitions.
- f) Weight: 5 lbs per sq ft (2.442 g / sq cm) maximum of partition surface area.

2) Chaining:

- a) Not required at partitions located inside Cultural Center or other non Cultural Hall areas including classrooms and platform/stage if included on Project.
- b) Required at partitions located between Cultural Center and any other adjacent room to Cultural Center:
 - (1) Attached continuous to every other panel on Cultural Center side of partition only beginning at lead post and for first 15 feet (4.57 m) minimum and additional 3 feet (0.90 m) to feather panels to standard fold.
 - (2) Bi-Parting Partitions: Required for both partitions.
 - (3) Location of chaining required at following partition panel locations:
 - (a) Within 24 inches (600 mm) minimum from top of partition.
 - (b) 54 inches (1 375 mm) minimum from bottom of partition.
 - (c) 12 inches (300 mm) minimum from bottom of partition.

c) Material: Sash chain (no open link chain).

3) Handle:

- a) Cast aluminum with steel interior for fasteners.
- b) Provide handle assembly so repair or replacement will be made without disassembling lead post or stabilizing bar.
- c) Mount with countersink fasteners to prevent injury.

4) Hanger Pin:

- a) Partitions less than 12 feet (3.6 m) high:
 - (1) Solid steel pins on all partitions.
- b) Partitions 12 feet (3.6 m) high or greater:
 - (1) Solid steel pins on all partitions.

5) Soffit Trim at track:

- a) Soffit trim to be attached with screws to header or track system.

6) Stabilizer Bar:

- a) Provide stabilizer bar and horizontally adjustable lead posts for all partitions 12 feet (3.657 m) and higher.

- b) Concealed, internally mounted diagonal support brace that is track supported and connected to the lead post for reinforced vertical alignment during latching and operation.
 - c) Requires **14 inch (355 mm)** wide header.
 - d) Once stabilizer bar is adjusted to Manufacturer's recommendations, provide bolt through assembly to secure no movement.
- 7) Stacking Depth:
- a) Calculation for Stack Depth:
 - (1) Total partition opening: **1-3/4 inches (45 mm)** maximum per lineal **foot (300 mm)**.
 - (2) Lead post: Add **6 inches (150 mm)**.
 - (3) Intermediate or center post (if required): Add **6 inches (150 mm)**.
 - (4) Chaining (if required): Add **3 inches (75 mm)**.
 - (5) Jamb thickness: Less **3/4 inches (19 mm)**.
 - b) Bi-Parting Partitions: Use single partition for each half of opening for stack depth.
- 8) Tie backs: Attached to secure partition in open position. Install straps to attach on one side of center of partition so as not to scratch partitions.
- 9) Trolley System:
- a) Steel construction on all partitions **12 feet (3.657 m)** and higher.
 - b) Steel or aluminum construction on all partitions under **12 feet (3.657 m)**.
 - c) Roller: **1-1/16 inch (27 mm)** with double steel race open ball bearings and nylon tires.
- E. Fabrication:
1. Fabricate accordion folding partitions according to actual field measurements of fully prepared, finished openings.
 - a. Owner-Furnished Product Manufacturer is responsible for field measurements and their accuracy.

2.2 ACCESSORIES

- A. Accordion Folding Partition Manufacturer's Track System:
1. Provide approved Manufacturer's track system.
- B. Flexible Acoustic Barrier:
1. Attach continuous flexible acoustic barrier to accordion folding partition header and accordion folding partition track system as recommended by Manufacture, so no voids or openings exist and meet required NIC requirements.
- C. Locks: Do not install locks as per church guidelines.
- D. Safety Sweep Clip:
1. Description:
 - a. Partition safety clip for accordion folding partition panels and lead post.
 2. Design Criteria:
 - a. As Approved by Owner.
 - b. Provide injection molded composite material with special rivet.
 - c. Provide complete coverage of bottom edge of each panel including hinge clips.
 - d. Provide cover for bottom edge of lead post.
 - e. Color: Black.
 3. Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a. Cornell: Part number 303610 to be attached with rivet part number 302322.

2.3 SOURCE QUALITY CONTROL

- A. Tests:
1. Sound Transmission Requirements:

- a. Accordion-type folding products tested for laboratory sound transmission loss performance according to ASTM E90, determined by ASTM E413 and rated for an STC as follows:
 - 1) Sound transmission class (STC) shall be STC 45 minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Evaluation And Assessment:

1. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Openings:
 - 1) Examine openings for adequacy in allowing successful accordion folding partition installation and operation.
 - 2) Verify openings are prepared to specified dimensions and plumb and level.
 - 3) Verify folding partition headers are level with required tolerances over entire length of opening.
 - 4) Verify conditions are in accordance with approved shop drawings.
 - b. Notify Architect in writing of inadequate conditions.
 - 1) Do not install accordion folding partitions until conditions have been corrected.
 - c. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:

1. Contractor's Responsibility:
 - a. Accordion Folding Partition Headers shall be leveled with finished floor to within +/- 1/4 inch (+/- 6 mm) tolerance over entire length of opening.
2. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Field measurement of door openings.

3.3 INSTALLATION

A. Special Techniques:

1. Install accordion folding partitions in accordance with Manufacturer's printed instruction.
 - a. Install so track system is aligned, level, etc, to eliminate catching or binding of rollers.
 - b. Install tie-backs at all accordion folding partitions. Adjust as necessary to keep accordion folding partition in stacked position.

3.4 FIELD QUALITY CONTROL

- #### **A. Non-Conforming Work:** Non-conforming work as covered in General Conditions applies, but is not limited to following: 1. Sound / Acoustic testing: - a. If accordion folding partitions do not meet specified NIC requirements or if accordion folding partitions are not ready for testing as result of accordion folding partition Manufacturer's non-performance, make necessary corrections and be responsible for additional fees and expenses required for subsequent testing by Architect's Sound / Acoustic Consultant. 2. Correct any work found defective or not complying with Contract Document requirements at no additional cost to Owner.

3.5 ADJUSTING

- #### **A. Owner-Furnished Product Manufacturer's Responsibility:**

1. Following completion of accordion folding partition installation, test and adjust accordion folding partitions for ease of operation.

3.6 CLEANING

A. General:

1. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Clean any soiling of accordion folding partitions as recommended by Manufacturer or any surrounding areas caused by installation of accordion folding partitions.

B. Building Damage:

1. Owner-Furnished Product Manufacturer's Responsibility:
 - a. Installer responsible for repair of all damaged surfaces to their original condition from accordion folding partition installation.

C. Waste Management:

1. Contractor's Responsibility:
 - a. Provide Dumpster as required in Section 01 7400.
2. Owner-Furnished Product Manufacturer's Responsibility:
 - a. All work areas are to be kept clean, clear and free of debris at all times.
 - b. Disposal of rubbish, debris, and packaging materials to Contractor provided Dumpster.

3.7 PROTECTION

A. General:

1. Contractor's Responsibility:
 - a. Upon completion of accordion folding partition installation, protect accordion folding partitions from damage and replace or repair subsequent damage at no cost to Owner.

END OF SECTION

SECTION 10 2813**COMMERCIAL TOILET ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Is Not Limited To:
 - 1. Selected accessories for Rest Rooms:
 - a. Grab Bars.
 - b. Mirrors.
 - c. Sanitary Napkin Disposal Container.
 - d. Shelf.
 - e. Single Robe Hook.
- B. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for blocking.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.
- C. Products Furnished But Not Installed Under This Section:
 - 1. Selected accessories for Rest Rooms:
 - a. Automatic touchless towel dispensers.
 - b. Soap dispensers.
 - c. Toilet tissue dispensers.
- D. Related Requirements:
 - 1. Section 01 1200: 'Multiple Contract Summary' soap dispensers, paper towel dispensers, and toilet tissue dispensers furnished by Owner (FM Group) and installed by Contractor.

1.2 REFERENCES

- A. Association Publications:
 - 1. United States Access Board:
 - a. Americans with Disabilities Act (ADA):
 - 1) ADA Standards:
 - a) ADA Accessibility Guidelines (ADAAG) (2004 or latest version).
- B. Definitions:
 - 1. Stainless Steel: Stainless steels are alloys of iron to which at least 10 percent chromium has been added to increase corrosion resistance and will not rust when exposed to weather. To obtain greater corrosion resistance, more nickel and chromium are added to the alloy. Along with iron and chromium, all stainless steels contain some carbon to make it stronger.
 - a. Austenitic Stainless Steel: Most popular of the stainless steels because of their ductility, ease of working and good corrosion resistance. Widely known as the 300 series.
 - 2. Stainless Steel Alloys:
 - a. Type 304 (UNS S30400): Austenitic stainless steel with non-magnetic properties in annealed condition that provide good corrosion resistance to both chemical and atmospheric exposures, with high resistance to oxidations. Most common and widely used stainless steel.
- C. Reference Standards:
 - 1. ASTM International:
 - a. A153/A153M-09, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.

- b. ASTM A653/A653M-13, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - c. ASTM A666-15, 'Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar'.
 - d. ASTM C1036-11, 'Standard Specification for Flat Glass'.
 - e. ASTM F446-85(2009), 'Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area'.
2. International Code Council / American National Standards Institute:
 - a. ICC/ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
 3. International Standard Organization:
 - a. ISO 25537:2008, 'Glass in Building - Silvered Flat Glass Mirror'.

1.3 SUBMITTALS

- A. Action Submittals:
 1. Product Data:
 - a. Manufacturer's product data sheets indicating operating characteristics, materials and finishes.
 - b. Mounting requirements and rough-in dimensions.
 2. Shop Drawings:
 - a. Schedule showing items used, location where installed, and proper attaching devices for substrate.
- B. Informational Submittals:
 1. Manufacturers' Instructions:
 - a. Provide operation, care and cleaning instructions.
- 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 for each product.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheets.

1.4 QUALITY ASSURANCE

- A. Source Limitations:
 1. For products listed together in same Part 2 articles, obtain products from single source from single manufacturer.

1.5 WARRANTY

- A. Manufacturer Warranty:
 1. Manufacturer's standard warranty.
- B. Special Mirror Warranty:
 1. Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage or frame corrosion defects within specified warranty period:
 - a. Warranty Period: fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 OWNER FINISHED PRODUCTS**

- A. Furnished by Owner:
1. Towel Dispensers.
 2. Soap dispensers.
 3. Toilet tissue dispensers.

2.2 MANUFACTURED UNITS

- A. Manufacturers:
1. Manufacturer Contact List:
 - a. AJW Architectural Products, A&J Washroom Accessories, Inc., New Windsor, NY www.ajwashroom.com.
 - b. American Specialties Inc (ASI), Yonkers, NY www.americanspecialties.com.
 - c. Bobrick Washroom Equipment Inc, North Hollywood, CA www.bobrick.com or Bobrick Washroom Equipment of Canada Ltd, Scarborough, ON (416) 298-1611.
 - d. Bradley Corp, Menomonee Falls, WI www.bradleycorp.com.
 - e. General Accessory Manufacturing Co (GAMCO), Durant, OK www.gamcousa.com.
- B. Materials:
1. Design Criteria:
 - a. Stainless Steel: ASTM A666 Type 304 (18-8); satin finish exposed surfaces unless otherwise indicated.
 - b. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
 - c. Fasteners:
 - 1) Exposed: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant.
 - 2) Concealed: Galvanized Steel.
 2. Rest Rooms:
 - a. Mirrors:
 - 1) Channel-Frame Mirror:
 - a) Frame: Type 304 or Type 430, 20 gauge stainless steel channel frame.
 - b) Roll-formed one piece construction.
 - c) Exposed surfaces have #4 satin finish.
 - d) Edges and corners are burr free.
 - e) Glass: **1/4 inch (6.4 mm)** silver coated and hermetically sealed. Guaranteed for 15 years against silver spoilage. Mirrors meet ASTM C1036 requirements.
 - f) Concealed surface mounted wall hanger.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AJW Architectural Products: Model U711.
 - b) American Specialties (ASI): Model 0620.
 - c) Bobrick: Model B-165.
 - d) Bradley: Model 781.
 - e) General Accessory (GAMCO): Model C Series.
 - b. Sanitary Napkin Disposal Container:
 - 1) Design Criteria:
 - a) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish. Seamless construction with radius and hemmed edges.
 - b) Stainless steel piano hinge.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AJW Architectural Products: Model U590.
 - b) American Specialties (ASI): Model 0852.
 - c) Bobrick: Model B-270.
 - d) Bradley: Model 4781-15.

- e) General Accessory (GAMCO): Model ND-1.
- c. Single Robe Hook:
 - 1) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish.
 - 2) Concealed mounting bracket.
 - 3) Stainless steel locking setscrew on bottom.
 - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AJW Architectural Products: Model UX110SF.
 - b) American Specialties (ASI): Model 7340-S.
 - c) Bobrick: Model B6717.
 - d) Bradley: Model 9114.
 - e) General Accessory (GAMCO): Model 76717.
 - 5) Provide one hook for each toilet compartment in area of work.
- d. Grab Bars:
 - 1) Configuration shown on Contract Drawings. Include center support for longer lengths when required:
 - 2) Design Criteria:
 - a) Comply with ADA guidelines and ADAAG accessible design for structural strength and local and state codes.
 - b) Concealed mount.
 - c) 18 ga (1.27 mm), type 304 stainless steel tubing.
 - d) 1-1/2 inch (38 mm) diameter.
 - e) Provide center support when required.
 - f) Snap-on flange covers.
 - g) Peened (non-slip) finish.
 - h) Sustain loads in excess of 900 lbs (408 kg).
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AJW Architectural Products: Model UG3 Series.
 - b) American Specialties (ASI): Model 3800 Series.
 - c) Bobrick: Model B-6806 Series.
 - d) Bradley: Model 812 Series.
 - e) General Accessory (GAMCO): Model 150 Series.
- e. Shelf:
 - 1) Design Criteria:
 - a) 18 ga (1.27 mm), stainless steel with No. 4 Satin finish.
 - b) 24 inches long by 6 inches wide.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AJW Architectural Products: Model U776.
 - b) American Specialties (ASI): Model 0692.
 - c) Bobrick: Model B-296.
 - d) Bradley: Model 756.
 - e) General Accessory (GAMCO): Model S-6.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with ADA Accessibility Guidelines and installation heights as shown on Contract Drawings.
- B. Assemble fixtures and associated fittings and trim in accordance with manufacturer's instructions.
- C. Install using mounting devices proper for base structure.
- D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.
- E. Where possible, mount like items in adjoining compartments back-to-back on same partition.

- F. Grab Bars:
 - 1. Install as per Manufacturers written installation instructions.
 - 2. Install grab bars to withstand downward force of not less than 250 lbf (1112 N) per ASTM F446.

3.2 REPAIR

- A. Repair or replace defective work, including damaged equipment and components.
- B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

3.3 CLEANING

- A. Clean unit surfaces, and leave in ready-to-use condition.

3.4 ADJUSTING

- A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment. Install new batteries in battery-powered items.

3.5 CLOSEOUT ACTIVITIES

- A. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.

END OF SECTION

SECTION 10 2814**BABY-CHANGING STATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But Is Not Limited To:
 - 1. Coordination and sequencing of Owner-Furnished baby-changing station as described in Contract Documents.
- B. Products Installed But Not Supplied Under This Section:
 - 1. Baby-changing station.
- C. Related Sections:
 - 1. Section 01 6400: 'Owner-Furnished Products', Owner will furnish baby-changing station. PART 2 PRODUCTS of this Section establishes quality of materials for information of Contractor, Architect, and Owner's representatives.
 - 2. Section 06 1100: 'Wood Framing' for blocking in wood stud framed walls for baby-changing stations.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute:
 - a. ANSI Z535.4-2011. 'Product Safety Signs and Labels'.
 - 2. ASTM International:
 - a. ASTM G21-13, 'Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi'.
 - b. ASTM F2285-04(2010), 'Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use'.
 - 3. International Code Council / American National Standards Institute:
 - a. ICC/ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the efforts of various trades affected by Work of this Section.
 - 2. Coordinate completions of solid blocking in walls.
- B. Sequencing:
 - 1. Install baby-changing stations after following has been completed:
 - a. Adjacent walls and ceilings are finished and painted.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Provide product literature or cut sheet on baby-changing station.
- B. Informational Submittals:
 - 1. Certificates:

- a. Manufacturer to provide \$10,000,000 minimum 'Certificate of Liability Insurance' policy.
 - 1) Policy on file at Church Headquarters. For questions, notify Mark Douglass at markdouglass@ldschurch.org.
 2. Manufacturer Instructions:
 - a. Printed installation instructions.
- 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 for defects in material and workmanship.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature or cut sheets.

1.5 WARRANTY

- A. Manufacturer Warranty:
1. Manufacturer's standard warranty for baby-changing station to be free from defects in material and workmanship under normal use and service, with proper maintenance, for five (5) years.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

- A. Category Two National Contract Manufacturers. See Section 01 6200 for definition of Categories.
1. Koala, Denver, CO www.koalabear.com.
- B. Baby Changing Station:
1. Description:
 - a. Molded high impact polyethylene with integral straps for securing baby.
 2. Design Criteria:
 - a. Manufacture to provide 'Certificate of Liability Insurance' policy.
 - b. Surface mounted.
 - c. Child protection straps.
 - d. Antimicrobial bed surface
 - e. Support **200 lbs (90 kg)** with minimal deflection.
 - f. Meet ADA regulations of ICC/ANSI A117.1 when properly installed.
 - g. Conform to ANSI Z535.4 for safety signs and labels, ASTM G21 for antifungal standards, and ASTM F2285 for consumer safety performance standard.
 3. Approved Products. See Section 01 6200 for definition of Categories:
 - a. Horizontal: Koala Kare model number KB200 by Koala.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
1. Verify that solid blocking has been installed in wall framing where changing station is to be installed.
 2. Do not install unit by any other means other than screws or lag bolts into solid blocking.

3.2 INSTALLATION

- A. Install items in accordance with Manufacturer's submitted, written instructions for screws or lag bolts into solid substrate capable of supporting **200 lbs (90 kg)**. Install using mounting devices proper for base structure.

END OF SECTION

SECTION 11 3114**RESIDENTIAL SERVING AREA APPLIANCES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Drop-In Handicap Accessible Range.
 - 2. Refrigerator.
 - 3. Microwave Oven.

- B. Related Requirements:
 - 1. Section 01 6400: Owner will furnish specified appliances. PART 2 of this Section establishes quality of materials for information of Contractor, Architect, and Owner's Representatives. General Contractor to install all Owner Furnished Products.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for appliance included in cabinet.
 - 3. Division 26: 'Electrical' for outlets and electrical service.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Manufacturer's Instructions:
 - a. Provide Anti-Tip Bracket installation instructions for free standing range.

- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature packaged for each appliance.

1.3 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

- A. Delivery And Acceptance Requirements:
 - 1. General Contractor responsibility:
 - a. Supervise unloading and handling for Owner Furnished Products.
 - b. Range:
 - 1) Verify Anti-Tip Brackets are included. Contact Owner for missing brackets.

- B. Storage And Handling Requirements:
 - 1. General Contractor responsibility:
 - a. Provide secure location protected from weather and other trades.

PART 2 - PRODUCTS**2.1 OWNER-FURNISHED PRODUCTS**

- A. Category Two National Contract Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1. Approved Manufacturers:
 - 2. Drop-In Handicap Accessible Range:
 - a. Approved Manufacturer:

- 1) General Electric.
 3. Refrigerator / Freezer:
 - a. Approved Manufacturer:
 - 1) General Electric.
 4. Microwave Oven:
 - a. Approved Manufacturer:
 - 1) Amana.
 - 2) General Electric.
 - 3) Panasonic.
 - 4) Samsung.
- B. Manufactured Units:
1. Drop-In Handicap Accessible Range:
 - a. 30 inch (750 mm) drop-in electric range:
 - b. Color: White.
 2. Refrigerator / Freezer:
 - a. 16 cu ft (0.45 cu meters) frost free model with top freezer compartment and reversible doors.
 - b. Color: White.
 3. Microwave Oven:
 - a. 800 watts.
 - b. Dimensions: 12 inches (300 mm) high by 24 inches (200 mm) wide by 13 inches (325 mm) deep.
 - c. Color: White.

2.2 ACCESSORIES

- A. Range:
1. Range Cord with 4 prong plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General Contractor shall install all Owner Furnished Products as identified in this specification section:
1. Drop-In Handicap Accessible Range:
 - a. Handicap Accessible Range must be installed into cabinet.
 - b. Handicap Accessible Range must be installed in accordance with manufacturer's instructions for electrical connections and unit mounting.

END OF SECTION

SECTION 22 0501**COMMON PLUMBING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for plumbing systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
 - 3. Furnish and install sealants relating to installation of systems installed under this Division.
 - 4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.
- C. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
 - 2. Section 07 8400: 'Firestopping' for quality of penetration firestop systems to be used on Project and submittal requirements.
 - 3. Section 07 9213: 'Elastomeric Joint Sealant' for quality at building exterior.
 - 4. Sections Under 09 9000 Heading: 'Paints And Coatings' for painting of plumbing items requiring field painting.
 - 5. Division 26: 'Electrical' for raceway and conduit, unless specified otherwise, and line voltage wiring.
 - 6. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Plumbing 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 (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:

- a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
 - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
 - c) Provide operating instructions to include:
 - (1) General description of fire protection system.
 - (2) Step by step procedure to follow for shutting down system or putting system into operation.
- b. Warranty Documentation:
- 1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Approvals:
1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
 3. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
1. Plumbing Subcontractor:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in plumbing 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Accept valves on site in shipping containers with labeling in place.
 2. Provide temporary protective coating on cast iron and steel valves.
 3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
1. In addition to requirements specified in Division 01, stored material shall be readily accessible for inspection by Architect until installed.
 2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.
- B. Special Warranty:
 - 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 - 2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 - 1. Weld-O-Let and Screw-O-Let fittings are acceptable.
 - 2. Use domestic made pipe and pipe fittings on Project, except non-domestic made cast iron pipe and fittings by MATCO-NORCA are acceptable.
- C. Sleeves:
 - 1. General:
 - a. Two sizes larger than bare pipe or insulation on insulated pipe.
 - 2. In Concrete And Masonry:
 - a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
 - 3. In Framing And Suspended Floor Slabs:
 - a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.
- D. Valves:
 - 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Drawings:
 - 1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.

3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- B. Verification Of Conditions:
1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.
 2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
 3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
 4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- C. Unforeseen Conditions:
1. Relocate/or remove and reinstall, any piping or plumbing fixtures or devices which are encountered during demolition which conflict with the new construction or which are to accommodate the new construction. The piping, devices, or fixtures are to be relocated to accommodate the new construction and service shall be maintained for its function. Remove device covers or fixtures which conflict with the new construction and reinstall the same after other trades have completed their work.

3.3 PREPARATION

- A. Changes Due To Equipment Selection:
1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
 2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
 3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
 4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.4 INSTALLATION

- A. Interface With Other Work:
1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
 2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.
- B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.
- C. Locating Equipment:
1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.

2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
 3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
 4. Determine exact route and location of each pipe before fabrication.
 - a. Right-Of-Way:
 - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:
 - 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- D. Penetration Firestops:
1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.
- E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
 2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.
- F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
 2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
 - a. Arrange so as to facilitate removal of tube bundles.
 - b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - 1) Make connections of dissimilar metals with di-electric unions.
 - 2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe 3/4 inch (19 mm) in diameter and smaller.
 - d. Install piping systems so they may be easily drained
 - e. Install piping to insure noiseless circulation.
 - f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
 3. Do not install piping in shear walls.
 4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
 5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
 6. Make changes in direction with proper fittings.
 7. Expansion of Thermoplastic Pipe:
 - a. Provide for expansion in every 30 feet (9 meters) of straight run.
 - b. Provide 12 inch (300 mm) offset below roof line in each vent line penetrating roof.
 8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.
- G. Sleeves:

1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. Follow Pipe Manufacturer's recommendations for PEX pipe penetrations through studs and floor slabs.
3. Sleeves through floors shall extend 1/4 inch (6 mm) above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
4. Sleeves through floors and foundation walls shall be watertight.

H. Escutcheons:

1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

A. Field Tests:

1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.

B. Non-Conforming Work:

1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
2. Repeat tests on new material, if requested.

3.7 CLEANING

A. Remove dirt, grease, and other foreign matter from each length of piping before installation:

1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.8 CLOSEOUT ACTIVITIES

A. Instruction of Owner:

1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.9 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

3.10 SEISMIC RESTRAINT

- A. Restrain all equipment and piping in compliance with the Authority Having Jurisdiction and the Building Code.

END OF SECTION

SECTION 22 0529**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Common hanger and support requirements and procedures for plumbing systems.
- B. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
 - 2. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
 - 3. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
 - 4. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
 - 5. Section 23 0529: 'Hangers And Supports For HVAC Piping And Equipment' for gas piping used with HVAC equipment.
 - 6. Section 23 0553: 'Identification For HVAC Piping And Equipment' for paint identification of gas piping used with HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.b-line.com.
 - c. Unistrut, Wayne, MI www.tyco-unistrut.com.
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support insulated pipes 2 inches (in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.

- 2) Support insulated pipes 2-1/2 inches (in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger: Anvil Fig. 260.
 - (2) Roller Assembly: Anvil Fig. 171.
 - (3) Insulation Protection Shield: Anvil Fig. 167.
 - (4) Equals by Cooper B-Line.
- 3) Support uninsulated copper pipe 2 inches (in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
 - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
 - (3) Equals by Cooper B-Line.
- 4) Support uninsulated copper pipe 2-1/2 inches (in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
 - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
 - (3) Equals by Cooper B-Line.
- c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller
1/2 inch	2-1/2 to 3-1/2 inches

- d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0

- 1) Size trapeze angles so bending stress is less than 10,000 psi.
- e. Riser Clamps For Vertical Piping:
 - 1) Type Two Acceptable Products:
 - a) Anvil Fig. 261.
 - b) Equals by Cooper B-Line.
- f. Steel Deck Bracket:
 - 1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Piping:
 - 1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:

- 1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
 - 2) Support thermoplastic pipe at 48 inches on center maximum.
 - 3) Support PEX pipe at 32 inches minimum on center.
 - 4) Provide support at each elbow. Install additional support as required.
- c. Supports for Vertical Piping:
- 1) Place riser clamps at each floor or ceiling level.
 - 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - 3) Provide clamps as necessary to brace pipe to wall.
- d. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.
- e. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

END OF SECTION

SECTION 22 0553**IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Materials:
 - 1. Paint:
 - a. One Coat Primer:
 - 1) 6-2 Quick Drying Latex Primer Sealer over fabric covers.
 - 2) 6-205 Metal Primer under dark color paint.
 - 3) 6-6 Metal Primer under light color paint.
 - b. Finish Coats: Two coats 53 Line Acrylic Enamel.
 - c. Performance Standard: Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA www.pittsburghpaints.com or PPG Canada Inc, Mississauga, ON (800) 263-4350 or (905) 238-6441.
 - d. Type Two Acceptable Products. See Section 01 6200.
 - 1) Paint of equal quality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
 - a) Benjamin Moore, Montvale, NJ www.benjaminmoore.com or Toronto, ON (800) 304-0304 or (416) 766-1176.
 - b) ICI Dulux, Cleveland, OH or ICI Paints Canada Inc, Concord, ON www.dulux.com.
 - c) Sherwin Williams, Cleveland, OH www.sherwin-williams.com.



PART 3 - EXECUTION**3.1 APPLICATION**

- A. Painting:
 - 1. Only painted legends, directional arrows, and color bands are acceptable.
 - 2. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
 - a. Adjacent to each item of equipment.
 - b. At point of entry and exit where piping goes through wall.
 - c. On each riser and junction.
 - d. Every 25 feet (7.6 m) on long continuous lines.
 - e. Stenciled symbols shall be one inch high and black.

3.2 ATTACHMENTS

- A. Schedules:
 - 1. Pipe Identification Schedule:

- a. Apply stenciled symbols as follows:

Pipe Use	Abbreviation	Direction of Flow
Domestic Cold Water	CW	
Domestic Hot Water	HW	

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 1116: 'Domestic Water Piping'.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Armacell, Mebane, NC www.armaflex.com.
 - b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - c. IMCOA, Youngsville, NC www.nomacokflex.com.
 - d. Johns-Manville, Denver, CO www.jm.com.
 - e. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - f. Manson, Brossard, PQ, Canada www.isolationmanson.com.
 - g. Nomaco Inc, Yopungsville, NC www.nomacokflex.com.
 - h. Owens-Corning, Toledo, OH www.owenscorning.com.
 - i. Speedline Corp, Solon, OH www.speedlinepvc.com.
- B. Materials:
 - 1. Above Grade Metal Piping:
 - a. Insulation For Piping:
 - 1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
 - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
45 - 130 Deg F	1/2 In	1/2 In	One In
 - 3) Performance Standards: Fiberglas ASJ by Owens-Corning.
 - 4) Type One Acceptable Manufacturers:
 - a) Childers Products.
 - b) Knauf.
 - c) Manson.
 - d) Owens-Corning.
 - e) Johns-Manville.
 - f) Equal as approved by Architect before bidding. See Section 01 6200.
 - b. Fitting, Valve, And Accessory Covers:
 - 1) PVC.
 - 2) Performance Standard: Zeston by Johns-Manville.
 - 3) Type One Acceptable Manufacturers:

- a) Knauf.
 - b) Speedline.
 - c) Johns-Manville.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
2. Below Grade Metal Piping:
- a. Insulation:
 - 1) 1/2 inch thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
3. Pex Piping, Above And Below Grade:
- a. Insulation:
 - 1) 1/2 inch thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Above Grade Piping:
1. Apply insulation to clean, dry piping with joints tightly butted.
 2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
 3. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive. Adhere 3 inch wide self-sealing butt joint strips over end joints.
 4. Fittings, Valves, And Accessories:
 - a. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
 - b. Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
 - 1) Alternate Method: Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two 1/8 inch wet coats of vapor barrier mastic reinforced with glass fabric extending 2 inches onto adjacent insulation.
 5. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Provide 16 ga by 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
 6. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Pipe Shield:
 - 1) Provide schedule 40 PVC by 6 inch (150 mm) long at each clevis and/or unistrut type hanger.
 - 2) Provide 16 ga by 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.

- 3) Provide 22 ga by 6 inch long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.

B. Below Grade Piping:

1. Slip underground pipe insulation onto pipe and seal butt joints.
2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

END OF SECTION

SECTION 22 1116**DOMESTIC WATER PIPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install potable water piping and connect to existing lines complete with necessary valves, connections, and accessories inside building as described in Contract Documents. Field verify existing piping as required.
- B. Related Requirements:
 - 1. Section 22 0501: 'Common Piping Requirements'.
 - 2. Section 22 0719: 'Plumbing Piping Insulation'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American Water Works Association:
 - a. AWWA C904-16, 'Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 inch (12 mm) Through 3 inch (76 mm) for Water Service'.
 - 2. ASTM International:
 - a. ASTM B88-14, 'Standard Specification for Seamless Copper Water Tube'.
 - b. ASTM E84-15b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - c. ASTM F876-15a, 'Standard Specification for Crosslinked Polyethylene (PEX) Tubing'.
 - d. ASTM F877-11a, 'Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems'.
 - e. ASTM F1807-15, 'Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing'.
 - f. ASTM F2023-15, "Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water".
 - 3. NSF International Standard:
 - a. NSF P171, 'Protocol for Chlorine Resistance of Plastic Piping Materials' (1999).
 - 4. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 14-2015, 'Plastic Piping System Components and Related Materials'.
 - b. NSF/ANSI 61-2015, 'Drinking Water System Components - Health Effects'.
 - c. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's Literature:
 - 1) PEX pipe and PEX pipe fittings.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Written report of sterilization test.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
1. Manufacturer Contact List:
 - a. Cash Acme, Cullman, AL www.cashacme.com
 - b. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Beamsville, ON www.cla-val.com.
 - c. Conbraco Industries Inc, Matthews, NC www.conbraco.com or Conbraco (Honeywell Ltd), Scarborough, ON (416) 293-8111.
 - d. Hammond Valve, New Berlin, WI www.hammondvalve.com.
 - e. Handy & Harmon Products Div, Fairfield, CT www.handyharmon.com or Handy and Harmon of Canada Ltd, Rexdale, ON (800) 463-1465 or (416) 675-1860.
 - f. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
 - g. Honeywell Inc, Minneapolis, MN www.honeywell.com.
 - h. Leonard Valve Co, Cranston, RI www.leonardvalve.com.
 - i. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
 - j. Nibco Inc, Elkhart, IN www.nibco.com.
 - k. Rehau, Leesburg, VA www.rehau-na.com.
 - l. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - m. Spence Engineering Co, Walden, NY www.spenceengineering.com.
 - n. Uponor Inc, Apple Valley, MN www.uponor-usa.com.
 - o. Viega ProPress, Wichita, KS www.viega-na.com.
 - p. Watts Regulator Co, Andover, MA www.wattsreg.com.
 - q. Wilkins (Zurn Wilkins), Paso Robles, CA www.zurn.com.
 - r. Zurn PEX, Inc., Commerce, TX www.zurnpex.com.
- B. Materials:
1. Design Criteria:
 - a. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
 - b. No CPVC allowed.
 2. Pipe:
 - a. Copper:
 - 1) Above-Grade:
 - a) Meet requirements of ASTM B88, Type L.
 - 2) Below-Grade:
 - a) Meet requirements of ASTM B88, Type K. 3/4 inch (19 mm) minimum under slabs.
 - b) 2 inches (50 mm) And Smaller: Annealed soft drawn.
 - b. Cross-Linked Polyethylene (PEX):
 - 1) Certified with NSF International against NSF Standards NSF/ANSI 14, NSF/ANSI 61, NSF/ANSI 372, and NSF P171 Protocol.
 - 2) Copper tube size (CTS) outside dimensions and Standard Dimension Ratio (SDR) of 9.
 - 3) Pressure rated for 160 psi (1.10 MPa) at 73 deg F (22.8 deg C), 100 psi (0.69 MPa) at 180 deg F (82 deg C), and 80 psi (0.552 MPa) at 200 deg F (93 deg C).
 - 4) Marked with Manufacturer's name, design pressure and temperature ratings, and third party certification stamp for NSF-PW.
 - 5) Manufactured by Engel or peroxide method (PEX-A) or by silane method (PEX-B).

- 6) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) RaupeX by Rehau.
 - b) Wirsbo Aquapex by Uponor.
 - c) ViegaPEX by Viega.
 - d) Zurn PEX by Zurn PEX.
3. Fittings:
 - a. For Copper Pipe: Wrought copper.
 - b. For PEX Pipe:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Everloc by Rehau.
 - b) Viega PEX Press Zero Lead Fittings with attached stainless steel sleeves or Viega PEX Press Radel-R Polymer with attached stainless steel sleeves by Viega.
 - c) ProPEX fittings by Uponor including EP flow-through multiport tees.
 - d) Zurn PEX XL, DZR and CR fittings.
4. Connections For Copper Pipe:
 - a. Above-Grade:
 - 1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.
 - 2) Viega ProPress System
 - b. Below Grade:
 - 1) Brazed using following type rods:
 - a) Copper to Copper Connections:
 - (1) AWS Classification BCuP-4 Copper Phosphorus (6 percent silver).
 - (2) AWS Classification BCuP-5 Copper Phosphorus (15 percent silver).
 - 2) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45 percent silver).
 - 3) Do not use rods containing Cadmium.
 - 4) Brazing Flux:
 - a) Approved Products:
 - (1) Stay-Silv white brazing flux by Harris Product Group.
 - (2) High quality silver solder flux by Handy & Harmon.
 - 5) Joints under slabs acceptable only if allowed by local codes.
 5. Ball Valves:
 - a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
 - b. Valves shall be two-piece, full port for 150 psi (1.03 MPa) SWP.
 - 1) Operate with flow in either direction, suitable for throttling and tight shut-off.
 - 2) Body: Bronze, 150 psig (1.03 MPa) wsp at 350 deg F (177 deg C) and 400 psig (2.76 MPa) wog.
 - 3) Seat: Bubble tight at 100 psig (0.69 MPa) under water.
 - c. Class One Quality Standard: Nibco T585 or S585.
 - 1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate cold water lines a minimum of 6 inches (150 mm) from hot water line.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Before pipes are covered, test systems in presence of Architect/Engineer at 125 psig (0.86 MPa) hydrostatic pressure for four (4) hours and show no leaks.
 2. Disconnect equipment not suitable for 125 psig (0.86 MPa) pressure from piping system during test period.

3.3 CLEANING

- A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect/Engineer. Allow sterilization solution to remain for twenty-four (24) hours and open and close valves and faucets several times during that time.
- B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
- C. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION

SECTION 22 1313**FACILITY SANITARY SEWERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install soil, waste, and vent piping systems and connect with existing waste and vent lines as described on bid documents. Field verify existing piping as required
 2. Perform excavation and backfill required by work of this Section.
- B. Related Requirements:
1. Sections Under 07 3000 Heading: Furnishing and installing of roof jacks and pipe flashing at roof.
 2. Section 07 8400: 'Firestopping' for quality of firestopping material.
 3. Section 22 0501: 'Common Plumbing Requirements'.
 4. Section 22 1319: 'Facility Sanitary Sewer Specialties' for furnishing of sewer specialties.
 5. Section 31 2316: 'Excavation' for criteria for performance of excavation.
 6. Section 31 2323: 'Fill' for criteria for performance of backfill and compaction.

1.2 REFERENCES

- A. Reference Standards:
1. American National Standards Institute / American Water Works Association:
 - a. ANSI/AWWA C110/A21.10-12, 'Ductile-Iron and Gray-Iron Fittings'.
 - b. ANSI/AWWA C111/A21.11-12, 'Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings'.
 - c. ANSI/AWWA C115/A21.15-11, 'Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges'.
 - d. ANSI/AWWA C116/A21.16-15, 'Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service'.
 - e. ANSI/AWWA C150/A21.50-14, 'Thickness Design of Ductile-Iron Pipe'.
 - f. ANSI/AWWA C151/A21.51-09, 'Ductile-Iron Pipe, Centrifugally Cast, for Water'.
 - g. ANSI/AWWA C153/A21.53-11, 'Ductile-Iron Compact Fittings for Water Service'.
 2. American Water Works Association (AWWA):
 - a. AWWA M41, 'Ductile-Iron Pipe and Fittings' (3rd Edition).
 3. ASTM International:
 - a. ASTM A74-15, 'Standard Specification for Cast Iron Soil Pipe and Fittings'.
 - b. ASTM A888-15, 'Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications'.
 - c. ASTM C564-14, 'Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings'.
 - d. ASTM D2235-04(2011), 'Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings'.
 - e. ASTM D2321-14, 'Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
 - f. ASTM D2564-12, 'Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'.
 - g. ASTM D3034-14, 'Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings'.
 - h. ASTM F628-12, 'Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core'.
 - i. ASTM F656-15, 'Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings'.

- j. ASTM F891-10, 'Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core'.
- 4. Cast Iron Soil Pipe Institute:
 - a. CISPI Standard 301-09, 'Standard Specification for Hubless Cast Iron Soil Pipe End Fittings for Sanitary & Storm Drain, Waste, and Vent Piping Applications'.
 - b. CISPI 310-11, 'Standard Specification for Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications'.
 - c. CISPI Handbook. 'Cast Iron Soil Pipe and Fittings Handbook' (2006).
- 5. International Code Council:
 - a. ICC IPC-2015, 'International Plumbing Code'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:

- a. American Brass & Iron (AB&I), Oakland, CA www.abifoundry.com.
- b. Clamp-All Corp, Haverhill, MA www.clampall.com.
- c. Anaco-Husky, Corona, CA www.anaco-husky.com.
- d. Josam Co, Michigan City, IN www.josam.com.
- e. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
- f. MG Piping Products Co, Stanton, CA www.mgcoupling.com.
- g. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
- h. Mission Rubber Co., Corona, CA www.missionrubber.com.
- i. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
- j. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
- k. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.

B. Performance:

1. Design Criteria:

- a. Multiple materials have been listed for Contractor's reference. Do not mix PVC and ABS on project.
- b. Minimum size of waste piping installed under floor slab on grade shall be 2 inches (50 mm).

C. Materials:

- 1. PVC Piping And Fittings: PVC Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F891, joined using cement primer meeting requirements of ASTM F656 and pipe cement meeting requirements of ASTM D2564.
 - a. Furnish wall cleanouts with chrome wall cover and screw.
- 2. ABS Piping And Fittings: ABS Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F628, joined with pipe cement meeting requirements of ASTM D2235.
 - a. Furnish wall cleanouts with chrome wall cover and screw.
- 3. Metal Buried Piping:
 - a. Approved Types: Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
 - b. Joint Material:
 - 1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
 - 2) No-Hub:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - b) American Brass & Iron: SuperGrip 304.
 - c) Anaco-Husky: Husky SD 4000 coupling.
 - d) Clamp-All: Neoprene gaskets with type 304 stainless steel clamp and 24 ga type 304 stainless steel housing.

- e) Mission Rubber: Heavy weight coupling.
 - f) MG Piping: MG Coupling.
 - g) Mifab: MI-XHUB – Heavy duty shielded coupling type 301 or 304 stainless steel.
4. Metal Above Grade Piping And Vent Lines:
- a. Approved Types:
 - 1) Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
 - 2) Vent lines 2-1/2 inches (64 mm) or smaller may be Schedule 40 galvanized steel.
 - b. Joint Material:
 - 1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
 - 2) No-Hub Pipe: Neoprene gaskets with stainless steel cinch bands.
5. Metal Fittings:
- a. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A74.
 - 1) Joint Material: Rubber gaskets meeting requirements of ASTM C564.
 - 2) Galvanized Pipe: Screwed Durham tarred drainage type.
 - b. Traps installed on cast iron bell and spigot pipe shall be service weight cast iron. Traps installed on threaded pipe shall be recess drainage pattern type.
 - c. P-Traps:
 - 1) Trap shall have clean out plug if installed in other than slab on grade.
 - 2) Type Two Acceptable Products.
 - a) JR Smith: 7220 deep seal cast iron.
 - b) Mifab: MI-950.
 - c) Zurn: Zurn Z-1000.
 - d) Equal as approved by Architect before installation. See Section 01 6200.
6. Cleanouts for Metal Piping:
- a. Furnish wall cleanouts with chrome wall cover and screw.
 - b. Type Two Acceptable Products:
 - 1) Finish Floors:
 - a) Josam: 56010.
 - b) J. R. Smith: 4023.
 - c) Mifab: C1100C-R-1.
 - d) Wade: W-6000.
 - e) Watts: CO-200-R.
 - f) Zurn: Z-1402.
 - 2) Resilient Flooring:
 - a) Josam: 56010-12.
 - b) J. R. Smith: 4140.
 - c) Mifab: C1100C-T-1.
 - d) Wade: W-6000-T.
 - e) Watts: CO-200-T.
 - f) Zurn: Z-1400.
 - 3) Finished Wall:
 - a) Josam: 58790.
 - b) J. R. Smith: 4530.
 - c) Mifab: C1460RD.
 - d) Wade: W8560E.
 - e) Watts: CO-460-RD.
 - f) Zurn: Z-1446.
 - 4) Exposed Drain Lines:
 - a) Josam: 58910.
 - b) J. R. Smith: 4510.
 - c) Mifab: C1460.
 - d) Wade: W8560B.
 - e) Watts: CO-460.
 - f) Zurn: Z-1440.
 - 5) General Purpose:
 - a) Josam: 58900.
 - b) J. R. Smith: 4400.
 - c) Mifab: C1300-MF

- d) Wade: W8550E.
 - e) Watts: CO-380.
 - f) Zurn: Z-1440.
- 6) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavate and backfill as specified in Sections 31 2316 and 31 2323 with following additional requirements:
1. Runs shall be as close as possible to those shown on Drawings.
 2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter 1/4 inch (6 mm) fall in one foot (300 mm) in direction of flow.
 3. Bottom of trenches shall be hard. Tamp as required.
 4. Remove debris from trench before laying of pipe.
 5. Do not cut trenches near footings without consulting Architect.
- B. Metal Pipe And Fittings:
1. Provide depression under bell of each joint to maintain even bearing of sewer pipe.
 2. Connect to street main as required by local authorities.
 3. Use jacks to make-up gasketed joints.
 4. Do not caulk threaded work.
 5. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- C. Thermoplastic Pipe And Fittings:
1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
 2. Above Grade: Locate pipe hangers every 4 feet (1.2 m) on center maximum and at elbows.
 3. Below Grade:
 - a. Install in accordance with Manufacturer's recommendations and ASTM D2321.
 - b. Stabilize unstable trench bottoms.
 - c. Bed pipe true to line and grade with continuous support from firm base.
 - 1) Bedding depth: 4 to 6 inches (100 to 150 mm).
 - 2) Material and compaction to meet ASTM standard noted above.
 - d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
 - e. Trench width at top of pipe:
 - 1) Minimum: 18 inches (450 mm) or diameter of pipe plus 12 inches (300 mm), whichever is greater.
 - 2) Maximum: Outside diameter of pipe plus 24 inches (600 mm).
 - f. Do not use backhoe or power equipment to assemble pipe.
 - g. Initial backfill shall be 12 inches (300 mm) above top of pipe with material specified in referenced ASTM standard.
 - h. Minimum cover over top of pipe not under building slab:
 - 1) 36 inches (900 mm) before wheel loading.
 - 2) 48 inches (1 200 mm) before compaction.
- D. Install piping so cleanouts may be installed as follows:
1. Where shown on Drawings and near bottom of each stack and riser.
 2. At every 135 degrees of accumulative change in direction for horizontal lines.
 3. Every 100 feet (30 meters) of horizontal run.
 4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.

- E. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.
- F. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
 - 1. 6 inches (150 mm) minimum above roof and 12 inches (300 mm) minimum from any vertical surface.
 - 2. Same size as vent pipe.
 - 3. In areas where minimum design temperature is below 0 deg F (minus 18 deg C) or where frost or snow closure may be possible:
 - a. Vent line terminations shall be same size as vent pipe, except no smaller than 2 inches (50 mm) in diameter.
 - b. Vents shall terminate 10 inches (250 mm) minimum above roof or higher if required by local codes.
- G. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.
- H. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Conduct tests for leaks and defective work. Notify Architect before testing.
 - 2. Metal Pipe System: After backfilling and compacting of trenches is complete but before placing floor slab, fill waste and vent system with water to roof level or 10 feet (3 meters) minimum, and show no leaks for two hours. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.
 - 3. Thermoplastic Pipe System:
 - a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or 10 feet (3 meters) minimum, and show no leaks for two hours. Correct leaks and defective work.
 - b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

END OF SECTION

SECTION 22 1319**FACILITY SANITARY SEWER SPECIALTIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under this Section as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 3013: 'Ceramic Tile' for floor drains in ceramic tile floors.
 - 2. Section 22 0501: 'Common Plumbing Requirements'.
 - 3. Section 22 1119: 'Domestic Water Piping Specialties'.
 - 4. Section 22 1313: 'Facility Sanitary Sewers' for installation of miscellaneous sanitary sewer specialties.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Josam Co, Michigan City, IN www.josam.com.
 - b. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - c. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
 - d. Proset Systems, Lawrenceville, GA www.prosetsystems.com.
 - e. Sioux Chief Manufacturing Co, Peculiar, MO www.siouxchief.com.
 - f. Sureseal Manufacturing, Tacoma WA www.thesureseal.com.
 - 1) Contact Information:
 - a) All Areas except Idaho and Utah: Rick Ensley (253) 564-0624, rick@thesureseal.com.
 - b) Idaho and Utah Areas: Mark Evans, phone (801) 748-1222, mark@franklinjames.com.
 - g. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - h. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - i. Zurn Industries, LLC, Erie PA www.zurn.com. or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
- B. Performance:
 - 1. Design Criteria:
 - a. All materials NOT required to be low lead compliant.
- C. Components:
 - 1. Drains And Drain Accessories:
 - a. Floor Drain **FD-1**:
 - 1) Approved types with deep seal trap and chrome plated strainer.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Josam: 30000-50-Z-5A.
 - b) J. R. Smith: 2010-A.
 - c) Mifab: F-1100-C.
 - d) Sioux Chief: 832.
 - e) Wade: 1100.
 - f) Watts: FD-200-A.

g) Zurn: Z-415.

D. Accessories:

1. Drain Accessories:

a. Floor Drains:

- 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Trap guard by Proset Systems. Provide model number to match floor drain.
 - b) Trap seal by Sureseal. Provide model number to match floor drain.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 22 4213**COMMERCIAL WATER CLOSETS AND URINALS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
 - 2. Section 22 0501: 'Common Plumbing Requirements'.
 - 3. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

- A. Definitions:
 - 1. High-Efficiency Toilet (HET): Toilets with effective flush volume of 1.28 gallons (4.8 liters) or less.
 - 2. Maximum Performance (MaP): Toilet testing that rates toilet efficiency and flush performance by measuring number of grams of solid waste (soybean paste and toilet paper) that a toilet can flush and remove completely from fixture in single flush represented as a scale or score. 1000 grams is highest score possible (www.map-testing.com).
- B. Reference Standards:
 - 1. American Society of Mechanical Engineers / CSA Group (Canadian Standards Association):
 - a. ASME A112.19.2-2013/CSA B45.1-13, 'Ceramic Plumbing Fixtures'.

1.3 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operation and Maintenance Data:
 - 1) Sensor Operated operation and maintenance manuals.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
 - b. AMTC - Advanced Modern Technologies Corp, Woodland Hills, CA www.amtcorporation.com.
 - c. Bemis Manufacturing Co, Sheboygan Falls, WI www.bemismfg.com.
 - d. Beneke by Sanderson Plumbing Products, Columbus, MS www.sppi.com.
 - e. Church Seat Co, Sheboygan Falls WI www.churchseats.com.
 - f. Delany Flush Valves, Charlottesville, VA www.delanyproduct.com.
 - g. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.

- h. Dearborn Brass, Cleveland, OH www.dearbornbrass.com.
 - i. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
 - j. Josam Co, Michigan City, IN www.josam.com.
 - k. Jay R. Smith Mfg. Co, Montgomery, AL www.jrsmith.com.
 - l. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
 - m. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
 - n. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
 - o. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
 - p. Olsonite Corp, Newnan, GA www.olsonite.net or Olsonite Co Ltd, Tilbury, ON (519) 682-1240.
 - q. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - r. South Fork Manufacturing, Coalville, UT (801) 953-3001 www.dirt-grabber.com.
 - s. Toto U.S.A., Inc., Morrow, GA www.totousa.com
 - t. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - u. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - v. Zurn Industries, LLC, Erie PA www.zurn.com. or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
- B. Performance:
1. Design Criteria:
 - a. Meet or exceed ASME A112.19.2/CSA B45.1 for Vitreous China Plumbing Fixtures.
 - b. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
 - c. All materials NOT required to be low lead compliant.
 - d. Do not use toilets with effective flush volume of less than 1.28 gallons (4.8 liters).
- C. Materials:
1. Water Closets:
 - a. Floor Mounted With Tank:
 - 1) HET (High-Efficiency Toilet) - Standard Fixture: **WC-1**
 - a) Water usage of 1.28 gallons (4.8 liters) per flush.
 - b) MaP Score of 1000 grams.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) American Standard: Cadet 3 Elongated 215CA.004.
 - (2) Gerber: Avalanche WS-21-812.
 - (3) Kohler: Wellworth K-3948.
 - (4) Toto: 'ECO Drake' CST744E.or CST744EG.
 - 2) HET (High-Efficiency Toilet) - Handicap Accessible Fixture: **WC-2**
 - a) Water usage of 1.28 gallons (4.8 liters) per flush.
 - b) 18 inch (450 mm) maximum rim height.
 - c) MaP Score of 1000 grams.
 - d) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) American Standard: Cadet Pro Right Height Elongated 215AA.104.
 - (2) Gerber: Avalanche WS-21-818.
 - (3) Kohler: Highline K-3949.
 - (4) Toto: 'ADA Drake' CST744EL.
 2. Water Closet Accessories:
 - a. Seats:
 - 1) Provide split front type with check hinge.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Standard And Handicap Accessible Fixtures:
 - (1) American Standard: 5905.100SS.
 - (2) Bemis: 1655SSC.
 - (3) Beneke: 527 SS.
 - (4) Church: 9500SSC.
 - (5) Kohler: K-4731-C.
 - (6) Olsonite: 95SSC.

- (7) Toto SC534.
- b. Supply Pipe And Stop:
- 1) Provide chrome plated quarter-turn brass ball valve, 12 inch (300 mm) braided stainless steel riser, and chrome-plated steel flange.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) McGuire: BV2166CC.
 - b) Zurn: Z8804.
3. Urinals:
- a. HEU (High-Efficiency Urinal) - Standard and ADA Accessible Fixture: **U-1**
- 1) Water usage of 0.5 gallons (1.9 liters) per flush.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) American Standard: Washbrook FloWise 6590.001.
 - b) Gerber: Monitor 27-730.
 - c) Kohler: Bardon K-4904-ET.
 - d) Sloan SU-1009.
 - e) Toto: UT447E.
4. Urinal Accessories:
- a. Carrier / Support:
- 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Josam.
 - b) Jay R. Smith.
 - c) Mifab.
 - d) Wade.
 - e) Zurn.
- b. Flush Valve:
- 1) HEU (High-Efficiency Urinal) - Standard:
 - a) Proximity sensor type with battery.
 - b) Low flow, 0.5 gallon (1.9 liters) per flush maximum.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) American Standard 6063.051.
 - (2) Delany: PL 1451-0.5.
 - (3) Delta: 81T231BTA factory set to 0.5 gallons per flush.
 - (4) Moen: 8315.
 - (5) Sloan: 8186-0.5.
 - (6) Zurn: ZER6003AV-EWS with maintenance override button.
- c. Flush Valve Filter:
- 1) Required in following flush valves:
 - a) Sloan.
 - b) Zurn.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) SFDG1 'Dirt Grabber' by South Fork Manufacturing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
1. Seal wall-mounted fixtures around edges to wall with sealant specified in Section 07 9213 'Elastomeric Joint Sealants'.
 2. Attach wall-hung fixtures to carriers.
 3. Support fixture hanger or arm free of finished wall.
- C. Adjust flush valves for proper flow.

- D. Provide each individual fixture supply with accessible chrome-plated stop valve with hand wheel.
- E. Urinals: Install with accessible stop or control valve in each branch supply line.
- F. Mounting:
 - 1. Water Closets:
 - a. ADA Accessible: Install with flush actuator located on wide side of stall.
 - 2. Urinals:
 - a. Standard: 24 inches (610 mm) from floor to bottom lip.
 - b. ADA Accessible: 17 inches (432 mm) maximum from floor to bottom lip.
- G. Water Closets:
 - 1. Floor or Wall Fixtures:
 - a. Make fixture connections with approved brand of cast iron flange, soldered or caulked securely to waste pipe. Make joints between fixtures and flanges tight with approved fixture setting compound or gaskets. Caulk between fixtures with sealant specified in Section 07 9213. Point edges.
- H. Flush Valve Filters:
 - 1. Install in Sloan and Zurn only flush valves.
 - 2. Install after water lines have been flushed out, but before turning water into flush valve.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 22 4216**COMMERCIAL LAVATORIES AND SINKS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
 - 2. Section 22 0501: 'Common Plumbing Requirements'.
 - 3. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

- A. Reference Standard:
 - 1. American National Standards Institute / International Code Council:
 - a. ANSI/ICC A117.1-2009, 'Standard for Accessible and Usable Buildings and Facilities'.
 - 2. American Society of Mechanical Engineers / Canadian Standards Association (CSA Group):
 - a. ASME A112.18.1-2012/CSA B125.1-12, 'Plumbing Supply Fittings'.
 - b. ASME A112.19.1-2013/CSA B45.2-13, 'Enamelled cast iron and enamelled steel plumbing fixtures'.
 - c. ASME A112.19.3-2008/CSA B45.4-08 (R2013), 'Stainless steel plumbing fixtures'.
 - 3. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2015, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

1.4 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's standard Warranty against material or Manufacturing defects.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:

1. Manufacturer Contact List:
 - a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
 - b. Brocar Products Inc, Cincinnati, OH www.brocar.com.
 - c. CECO, Huntington Park, CA www.cecosinks.com.
 - d. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
 - e. Dearborn Brass, Tyler, TX www.dearbornbrass.com.
 - f. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
 - g. Engineered Brass Co. (EBC) (Just Manufacturing Co.), Franklin Park, IL www.justmfg.com.
 - h. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
 - i. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
 - j. Josam Co, Michigan City, IN www.josam.com.
 - k. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - l. Just Manufacturing Co, Franklin Park, IL www.justsinks.com.
 - m. Keeney Manufacturing Co, Newington, CT www.keeneymfg.com.
 - n. Kindred USA, Midland, ON www.kindred-sinkware.com.
 - o. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
 - p. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
 - q. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
 - r. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
 - s. Omni Flow Controls, Harbor City, CA www.chronomite.com or www.omniflowcontrols.com.
 - t. Plumberex Specialty Products, Palm Springs, CA www.plumberex.com.
 - u. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - v. Speakman Company, New Castle, DE www.speakmancompany.com.
 - w. Symmons, Braintree, MA www.symmons.com.
 - x. T & S Brass & Bronze Works Inc, Travelers Rest, SC www.tsbrass.com.
 - y. TrueBro Inc, Collierville, TN www.truebro.com.
 - z. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - aa. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - bb. Zurn Commercial Brass, Sanford, NC www.zurn.com or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
 - cc. Zurn Cast Metal, Erie, PA www.zurn.com.

B. Performance:

1. Design Criteria:
 - a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
 - b. Faucets and other fixture fittings shall conform to requirements of ASME A112.18.1/CSA B125.1.
 - c. Lavatories shall conform to requirements of:
 - 1) Enamelled cast iron and enamelled steel fixtures.
 - a) ASME A112.19.1/CSA B45.2.
 - b) CSA B45.2/ASME A112.19.1.
 - 2) Stainless steel plumbing fixtures:
 - a) ASME A112.19.3/CSA B45.4.
 - b) CSA B45.4/ASME A112.19.3.

C. Components:

1. Lavatories And Fittings:
 - a. Standard and ADA Accessible Counter Top Lavatories: **L-1**
 - 1) Size 20 by 17 inches (500 by 430 mm) nominal.

- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) American Standard: Aqualyn 0476.028.
 - b) Gerber: Luxoval 12-844.
 - c) Kohler: Pennington K-2196-4N.
- b. Standard and ADA Accessible Self Supporting Lavatories: **L-2**
 - 1) Size: 20 by 18 inches (500 by 450 mm) nominal.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) American Standard: Lucern 0355.012.
 - b) Kohler: Greenwich K-2032.
 - 3) Carrier / Support:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Josam: 17100.
 - (2) Jay R. Smith: 0700.
 - (3) Mifab: MC-41.
 - (4) Wade: 520-M36.
- c. Lavatory Fittings:
 - 1) Faucet and Grid Strainer For Standard and ADA Accessible Sinks:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) American Standard: Monterrey Two-Handle Centerset Lavatory Faucet with Vandal-Resistant Wrist Blade handles and grid strainer drain 5502.170.
 - (2) Chicago: 802-317CP with K7715 strainer.
 - (3) Delta: 2529HDF.
 - (4) Gerber: CO-44-412.
 - (5) Kohler: K-7404-5A with K-13885 strainer.
 - (6) Moen: 8215 with 14750 grid strainer.
 - (7) Speakman: SC 3074.
 - (8) T & S: B-0890 with B-0899 Grid Strainer.
 - (9) Zurn: Z-81104 with McGuire 155A grid strainer.
 - 2) Flow Control Fitting:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide vandal-proof type in place of aerator. Flow shall be 0.5 gpm.
 - c) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - (1) Omni L-200 Series by Chronomite Laboratories.
 - 3) Supply pipes with stops:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide chrome plated quarter-turn brass ball valve, 12 inches (305 mm) long braided stainless steel riser, and chrome-plated steel flange.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) McGuire: BV2165CC.
 - (2) Zurn: Z8804 LRQ-PC.
 - 4) Trap:
 - a) Description:
 - (1) 17 gauge (1.4 mm) tube 'P' trap, chrome plated.
 - b) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Dearborn.
 - (2) Engineered Brass Company (EBC).
 - (3) Keeney Manufacturing.

- (4) McGuire.
- (5) Zurn.
- 5) Safety Covers for ADA Accessible Lavatories:
 - a) Description:
 - (1) Provide protection on water supply pipes and on trap.
 - b) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Trapwrap by Brocar Products Inc.
 - (2) Pro Wrap by McGuire Products.
 - (3) Lav Guard 2 by TrueBro.
 - (4) Pro Extreme by Plumberex.
- 2. Stainless Steel Sinks And Fittings:
 - a. Design Criteria:
 - 1) Not required to meet NSF International Standards for Lead Free.
 - 2) Self-rimming, 18 gauge (1.2 mm) stainless steel, satin finish.
 - b. Double Compartment Serving Area Sink: **S-1**
 - 1) Design Criteria:
 - a) Not required to meet NSF International Standards for Lead Free.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Elkay: LR 3319.
 - b) Just: DL-1933-A-GR.
 - c) Kindred: LBT 4408P-1.
 - c. Stainless Steel Sink Fittings:
 - 1) Gooseneck Faucets for Compartment Serving Area Sinks:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Moen: 8227. (swivel).
 - (2) Speakman: SC-5724. (swivel).
 - 2) Supply pipes with stops:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide chrome plated quarter-turn brass ball valve, 12 inches (300 mm) long braided stainless steel riser, and chrome-plated steel flange.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) McGuire: BV2165CC.
 - (2) Zurn: Z8804 LRQ-PC.
 - 3) Flow Control Fitting:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide vandal-proof type in place of aerator. Flow shall be 1.5 gpm.
 - c) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - (1) Omni A-200 Series by Chronomite Laboratories.
 - 4) Waste For Serving Area Stainless Steel Sink:
 - a) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Elkay: LK-99.
 - (2) Kindred: 1130.
 - (3) Kohler: K8801.
 - (4) McGuire: 151.
 - (5) Zurn Z-8740-PC.

- 5) Trap:
 - a) Description:
 - (1) 17 gauge (1.4 mm) tube 'P' trap, chrome plated.
 - b) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Dearborn.
 - (2) Engineered Brass Company (EBC).
 - (3) Keeney Manufacturing.
 - (4) McGuire: MCT150075NCZN.
 - (5) Zurn.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
- C. Seal wall-mounted fixtures around edges to wall and counter top fixtures to countertop with sealant specified in Section 07 9213.
- D. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.
- E. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.
- F. Self-Supporting Lavatories: Install using carriers. Support carrier free of finished wall.
- G. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.
- H. Install ADA Accessible Lavatories as per ADA height mounting requirements.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 22 4700**DRINKING FOUNTAINS AND WATER COOLERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install drinking water cooling system units as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 0501: 'Common Plumbing Requirements'.
 - 2. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

- A. Reference Standard:
 - 1. American National Standards Institute / International Code Council:
 - a. ANSI/ICC A117.1-2009, 'Standard for Accessible and Usable Buildings and Facilities'.
 - 2. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2012, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Approvals:
 - 1. ADA Accessible Products to meet ANSI/ICC A117 Accessible requirements.
 - 2. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Acorn Aqua, City of Industry, CA www.acornaqua.com.
 - b. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
 - c. Halsey Taylor, Oak Brook, IL www.halseytaylor.com.
 - d. Oasis, Tri Palm International, Columbus OH www.oasiswatercoolers.com.
- B. Design Criteria:
 - 1. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
 - 2. Interior exposed pipe, valves, and fixture trim shall be chrome plated.
 - 3. Do not use flexible water piping.
- C. Materials:
 - 1. ADA Accessible Bi-Level Fountain: **DF-1**

- a. Include accessory fountain. Vandal proof operating bar on front and both sides. 7.8 GPH (29.5 LPH) minimum of 50 deg F (10 deg C) water with 90 deg F (32 deg C) room temperature, 1/5 horsepower motor, 120 V, 60 Hz, single phase. Flexi-guard or chrome plated brass bubbler.
- b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) AcornAqua: AquaAccess A172408B-UBL.
 - 2) Elkay: Model EZSTL8LC.
 - 3) Halsey Taylor: HAC8FSBL-Q-ADA.
 - 4) Oasis: PG8ACSL.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fixtures with accessible stop or control valve.
- B. Mounting:
 1. General:
 - a. Coordinate location of fountain with location and height of electrical outlet to ensure concealment of outlet by fountain.
 - b. Anchor bottom of fountain to wall.
 - c. Install 3/8 inch (9.5 mm) IPS union connection and quarter turn ball valve to building supply line.
 - d. Install 1-1/4 inch (32 mm) IPS slip cast brass 'P' trap. Install trap so it is concealed.
 2. Accessible Drinking Fountains:
 - a. Spout outlets of wheelchair accessible drinking fountains shall be 36 inches (915 mm) maximum above floor.
 - b. Spout outlets of drinking fountains for standing persons shall be 38 inches (965 mm) and 43 inches (1090 mm) maximum above floor.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 23 0501**COMMON HVAC REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for HVAC systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
 - 2. Shop Drawings:
 - a. Schematic control diagrams for each separate heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
 - b. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays. Include drawings showing electrical power requirements and connection locations.
 - c. Drawing of each temperature control panel identifying components in panels and their function.
 - d. Other shop drawings required by Division 23 trade Sections.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.
 - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
 - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.

- (3) Summary list of mechanical equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.
 - c) Provide operating instructions to include:
 - (1) General description of each HVAC system.
 - (2) Step by step procedure to follow in putting each piece of HVAC equipment into operation.
 - (3) Provide diagrams for electrical control system showing wiring of items such as smoke detectors, fuses, interlocks, electrical switches, and relays.
- b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 23.
- c. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Copies of approved shop drawings.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Perform work in accordance with applicable provisions of Gas Ordinances applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
 3. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
 1. Company:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in HVAC 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Accept valves on site in shipping containers with labeling in place.
- B. Storage And Handling Requirements:
 1. In addition to requirements specified in Division 01:
 - a. Stored material shall be readily accessible for inspection by Architect until installed.
 - b. Store items subject to moisture damage, such as controls, in dry, heated spaces.
 - c. Provide temporary protective coating on cast iron and steel valves.
 - d. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
 2. Protect bearings during installation. Thoroughly grease steel shafts to prevent corrosion.

1.5 WARRANTY

- A. Manufacturer Warranty:

1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.
- B. Special Warranty:
 1. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 2. If HVAC sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 1. Use domestic made pipe and pipe fittings on Project.
 2. Weld-O-Let and Screw-O-Let fittings are acceptable.
- C. Sleeves:
 1. In Framing: Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal two sizes larger than bare pipe or insulation on insulated pipe.
 2. In Concrete And Masonry: Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
- D. Valves:
 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Drawings:
 1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- B. Verification Of Conditions:

1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
3. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
4. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

3.3 PREPARATION

- A. Changes Due To Equipment Selection:
1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
 2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
 3. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
 4. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

3.4 INSTALLATION

- A. Interface With Other Work:
1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
 2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
- B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.
- C. Locating Equipment:
1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
 2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
 3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
 4. Determine exact route and location of each pipe and duct before fabrication.
 - a. Right-Of-Way:
 - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, steam, steam condensate, and drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:

- 1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
- 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Piping:

1. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus.
 - a. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.
 - b. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings.
 - 1) Arrange so as to facilitate removal of tube bundles.
 - 2) Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - a) Make connections of dissimilar metals with di-electric unions.
 - b) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - 3) Do not use reducing bushings, street elbows, bull head tees, close nipples, or running couplings.
 - 4) Install piping systems so they may be easily drained. Provide drain valves at low points and manual air vents at high points in hot water heating and cooling water piping.
 - 5) Install piping to insure noiseless circulation.
 - 6) Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
 - c. Do not install piping in shear walls.
2. Properly make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Cut piping accurately for fabrication to measurements established at site. Remove burr and cutting slag from pipes.
 - b. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
 - c. Make changes in direction with proper fittings.
 - d. Expansion of Thermoplastic Pipe:
 - 1) Provide for expansion in every 30 feet (9 meters) of straight run.
 - 2) Provide 12 inch (300 mm) offset below roof line in each vent line penetrating roof.
3. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade. Seal sleeves with specified sealants.
 - a. Sleeves through floors shall extend 1/4 inch (6 mm) above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
 - b. Sleeves through floors and foundation walls shall be watertight.
4. Provide spring clamp plates (escutcheons) where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.
5. Remove dirt, grease, and other foreign matter from each length of piping before installation.
 - a. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
 - b. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
 - c. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

E. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.

F. Sealants:

1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.

2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
 1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Perform tests on HVAC piping systems. Furnish devices required for testing purposes.
- B. Non-Conforming Work:
 1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
 2. Repeat tests on new material, if requested.

3.7 SYSTEM START-UP

- A. Off-Season Start-up:
 1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
 2. Notify Owner seven days minimum before scheduled start-up.
 3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
 4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.
- B. Preparations that are to be completed before start up and operation include, but are not limited to, following:
 1. Dry out electric motors and other equipment to develop and properly maintain constant insulation resistance.
 2. Make adjustments to insure that:
 - a. Equipment alignments and clearances are adjusted to allowable tolerances.
 - b. Nuts and bolts and other types of anchors and fasteners are properly and securely fastened.
 - c. Packed, gasketed, and other types of joints are properly made up and are tight and free from leakage.
 - d. Miscellaneous alignments, tightenings, and adjustments are completed so systems are tight and free from leakage and equipment performs as intended.
 3. Motors and accessories are completely operable.
 4. Inspect and test electrical circuitry, connections, and voltages to be properly connected and free from shorts.
 5. Adjust drives for proper alignment and tension.
 6. Make certain filters in equipment for moving air are new and of specified type.
 7. Properly lubricate and run-in bearings in accordance with Manufacturer's directions and recommendations.

3.8 CLEANING

- A. Clean exposed piping, ductwork, and equipment.

- B. No more than one week before Final Inspection, flush out bearings and clean other lubricated surfaces with flushing oil. Provide best quality and grade of lubricant specified by Equipment Manufacturer.
- C. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.9 CLOSEOUT ACTIVITIES

- A. Instruction Of Owner:
 - 1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of mechanical systems utilizing Operation And Maintenance Manual when so doing:
 - a. Minimum Instruction Periods:
 - 1) HVAC and Refrigeration: Four (4) hours.
 - 2) Temperature Control: Four (4) hours.
 - b. Conduct instruction periods after Substantial Completion inspection when systems are properly working and before final payment is made. None of these instructional periods shall overlap another.

3.10 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.
- B. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.
- C. After start-up, continue necessary lubrication and be responsible for damage to bearings while equipment is being operated up to Substantial Completion.

END OF SECTION

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SECTION 23 0529**HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Common hanger and support requirements and procedures for HVAC systems.
- B. Related Requirements:
1. Section 23 0553: 'Identification For HVAC Piping And Equipment' for HVAC piping and equipment identification signage requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Section 23 0529 to coordinate with Section 23 0553 for stencil and band color locations and identification requirements of HVAC piping and equipment for field application.

1.3 SUBMITTALS

- A. Action Submittals:
1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Manufacturers:
1. Class Two Quality Standard Approved Manufacturers. See Section 01 6200:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.cooperblineline.com.
 - c. Erico International, Solon, OH www.erico.com.
 - d. Hilti Inc, Tulsa, OK www.hilti.com.
 - e. Minerallac, Hampshire, IL www.minerallac.com.
 - f. Thomas & Betts, Memphis, TN www.superstrut.com.
 - g. Unistrut, Wayne, MI www.unistrut.com.

B. Performance:

1. Design Criteria:
 - a. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller
1/2 inch	2-1/2 to 3-1/2 inches
5/8 inch	4 to 5 inches
3/4 inch	6 inches
7/8 inch	8 to 12 inches

- b. Support rods for multiple pipes supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
No.	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0
2	5/8 Inch	Six	Four	Three	Two	0	0	0
2	5/8 Inch	Nine	Seven	Five	Three	Two	Two	0
2	5/8 Inch	Twelve	Nine	Seven	Five	Three	Two	Two

- 1) Size trapeze angles so bending stress is less than 10,000 psi (69 Mpa).

C. Materials:

1. Hangers, Rods, Channels, Attachments, And Inserts:
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from clevis hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - c. Class Two Quality Standards:
 - 1) Support insulated pipes with clevis hanger equal to Anvil Fig 260 or roller assembly equal to Anvil Fig 171 with an insulation protection shield equal to Anvil Fig 167. Gauge and length of shield shall be in accordance with Anvil design data.
 - 2) Except uninsulated copper pipes, support uninsulated pipes from clevis hanger equal to Anvil Fig 260. Support uninsulated copper pipe from hanger equal to Anvil Fig CT-65 copper plated hangers and otherwise fully suitable for use with copper tubing.
 - d. Riser Clamps For Vertical Piping:
 - 1) Class Two Quality Standard: Anvil Figure 261.
 - e. Concrete Inserts:
 - 1) Suitable for special nuts size 3/8 inch (9.5 mm) through 7/8 inch (22 mm) with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
 - 2) Class Two Quality Standards:
 - a) Standard Inserts: Anvil Figure 282.
 - 3) Class One Quality Standards:
 - a) Continuous Inserts: Unistrut P-3200 series.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.

EXECUTION

2.2 INSTALLATION

- A. Piping:
 1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using support channels and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at 96 inches (2 400) mm on center maximum for pipe 1-1/4 inches (32 mm) or larger and 72 inches (1 800 mm) on center maximum for pipe 1-1/8 inch (28 mm) or less.
 - 2) Support thermoplastic pipe at 48 inches (1 200 mm) on center maximum.
 - 3) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:
 - 1) Place riser clamps at each floor or ceiling level.
 - 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - 3) Provide clamps as necessary to brace pipe to wall.

- d. Install supports from inserts cast into concrete floor system, including concrete joists and floor slabs. Where inserts cannot be used, provide expansion shields and support hangers from angles held in place by expansion bolts, never directly from expansion bolt itself. Provide calculations necessary to determine number of expansion bolts required to equal capacity of cast-in-place insert.

END OF SECTION

SECTION 23 0553**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But not Installed Under This Section:
1. Identification of HVAC piping and equipment as described in Contract Documents including:
 - a. Stencils and band colors for piping used in HVAC equipment.
- B. Related Requirements:
1. Section 22 0529: 'Hangers And Supports For Plumbing' for field installation of pipe stencils and band colors for identification for piping used with HVAC equipment.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Description:
1. Abbreviations for Pipe Stencils and Equipment Identification and Band Colors for Pipe Identification:
 - a. Apply stenciled symbols and color banding as follows. Extend color band 2 inches (50 mm) minimum beyond each side of stenciled symbols.

Pipe Type	Band Color	Symbol
Hot Water Supply	Orange	HWS
Hot Water Return	Lt Orange	HWR
- B. Materials:
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.
 2. Description:
 - a. Ferrous Metal:
 - 1) New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
 - 2) Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system.
 3. Performance Requirements:
 - 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. Maintain specified colors, shades, and contrasts.
 4. Paint (one coat):
 - a. Primer:
 - 1) Ferrous Metal:
 - a) MPI 107, 'Primer, Rust-Inhibitive, Water Based'.
 - (1) Color: white.
 - b. Finish Coat (two coats):
 - 1) Ferrous Metal:
 - a) MPI 153, 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION**3.1 APPLICATION**

- A. Painting:
1. New Surfaces:
 - a. Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
 2. Existing Surfaces:
 - a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare metal surfaces immediately.
 - b. Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
 - c. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
 - d. Apply prime coat over entire surface to be painted.
 - e. Lightly sand entire surface.
 - f. Clean surface as recommended by Paint Manufacturer.
 - g. Apply finish coats.
 3. Leave equipment in like-new appearance.
 4. Only painted legends, directional arrows, and color bands are acceptable.
 5. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
 - a. Adjacent to each item of equipment.
 - b. At point of entry and exit where piping goes through wall.
 - c. On each riser and junction.
 - d. Every 25 feet (7.620 m) on long continuous lines.
 - e. Stenciled symbols shall be one inch (25 mm) high and black.

END OF SECTION

SECTION 23 0719**HVAC PIPING INSULATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install insulation for hot water heating and return piping system as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 0501: 'General HVAC Requirements'.
 - 2. Section 23 2113: 'Hydronic Piping: Above Grade'

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
 - 1. Keep materials and work dry and free from damage.
 - 2. Replace wet or damaged materials at no additional cost to Owner.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - b. Foster Products Corp, Oakdale, MN www.fosterproducts.com.
 - c. Johns-Manville, Denver, CO www.jm.com.
 - d. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - e. Manson, Brossard, BC, Canada www.isolationmanson.com.
 - f. Owens-Corning, Toledo, OH www.owenscorning.com or Owens-Corning Canada Inc, Willowdale, ON (416) 733-1600.
 - g. Ramco, Lawrenceville, NJ www.ramco.com.
 - h. Nomac, Zebulon, NC www.nomaco.com.
 - i. Speedline Corp, Solon, OH www.speedlinepvc.com.
- B. Materials:
 - 1. Hot-Water-Heat Piping Systems:
 - a. Heavy density fiberglass with fire retardant vapor barrier jacket with self-sealing laps.
 - b. Thickness: For piping exposed to outdoor air, increase thickness by 1/2 inch **50 mm**.
 - 1) Pipe:
 - a) 1-1/2 inch (**38 mm**).for pipe sizes ≤ 1.5 inch (**38 mm**) diameter.
 - b) 3 inch (**38 mm**).for pipe sizes > 1.5 inch (**38 mm**) diameter.
 - 2) Pipe Fittings:
 - a) 1-1/2 inch (**38 mm**).for pipe sizes ≤ 1.5 inch (**38 mm**) diameter.
 - b) 3 inch (**38 mm**).for pipe sizes > 1.5 inch (**38 mm**) diameter.
 - 3) Performance Standard: Fiberglass heavy density with ASJ-SSL jacket by Owens-Corning.
 - 4) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Manson.

- b) Johns Manville.
- c) Owens-Corning.
- c. Vapor Barrier Adhesive: As recommended by Insulation Manufacturer.
- d. Covers For Valves And Fittings:
 - 1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Zeston by Johns Manville.
 - b) Speedline.
- e. Shields: 22 ga (0.92 mm) by 12 inch (300 mm) long galvanized steel.
- f. PVC jacket.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before application of insulating materials, brush clean surfaces to be insulated and make free from rust, scale, grease, dirt, moisture, and any other deleterious materials.
- B. Use drop cloths over equipment and structure to prevent adhesives and other materials spotting the work.

3.2 INSTALLATION

- A. Hot Water Heating System:
 - 1. Pipes:
 - a. Butt joints firmly together.
 - b. Seal vapor barrier longitudinal seam overlap with vapor barrier adhesive.
 - c. Wrap butt joints with 4 inch (100 mm) strip of vapor barrier jacket material cemented with vapor barrier adhesive.
 - d. Finish with bands applied at mid-section and at each end of insulation.
 - 2. Valves And Fittings:
 - a. Insulate by one of following methods:
 - 1) With hydraulic setting insulating cement, or equal, to thickness equal to adjoining pipe insulation.
 - 2) With segments of molded pipe insulation securely wired in place.
 - b. Finish fittings and valves with canvas coated with weather barrier mastic or securely fitted Zeston covers.
 - 3. Pipe Hangers: Provide shields at each pipe hanger to protect pipe insulation from crushing.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 - 1. Method of installing insulation shall be subject to approval of Architect. Sloppy or unworkmanlike installations are not acceptable.

3.4 CLEANING

- A. Leave premises thoroughly clean and free from insulating debris.

3.5 PROTECTION

- A. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

END OF SECTION

SECTION 23 2113**HYDRONIC PIPING: Above Grade****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install hydronic heating and cooling piping and specialties as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 0501: 'Common HVAC Requirements'.
 - 2. Section 23 0719: 'HVAC Piping Insulation' for Hot Water Heat Piping Insulation.
 - 3. Section 23 8233: 'Convectors'.
 - 4. Division 26: Electrical service and connections.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless'.
 - b. ASTM A234/A234M-15, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service'.
 - 2. American Society of Mechanical Engineers:
 - a. ASME B16.22-2013, "Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings'.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Armstrong International, Three Rivers, MI www.armstrong-intl.com.
 - b. Bell & Gossett, Morton Grove, IL www.bellgossett.com.
 - c. Center Line by Crane Valve, Conroe, TX www.cranevalve.com.
 - d. Conbraco Industries, Matthews, NC www.conbraco.com.
 - e. Crane, Cullman, AL www.cranevalve.com.
 - f. Dow Chemical, Midland, MI www.dow.com.
 - g. Febco, Denver, Co www.repmasters.com.
 - h. Hammond Valve, New Berlin, WI www.hammondvalve.com.
 - i. Handy & Harman Products Div, Fairfield, CT www.handyharman.com.
 - j. Harris Products Group, Mason, OH www.harrisproductsgroup.com.
 - k. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
 - l. Mueller Steam Specialty, Saint Pauls, NC www.muellersteam.com.
 - m. Nibco Inc, Elkhart, IN www.nibco.com.
 - n. Stockham, Cullman, AL www.stockham.com.
 - o. Taco Inc, Cranston, RI www.taco-hvac.com.
 - p. Thrush Co Inc, Peru, IN www.thrushco.com.
 - q. Victaulic Company of America, Easton, PA www.victaulic.com.
 - r. Watts Regulator Co, North Andover, MA www.wattsreg.com.

B. Materials**1. Steel Pipe:****a. Types of Pipe:**

- 1) Schedule 40 Black Carbon Steel Pipe meeting requirements of ASTM A53/A53M, Type E or F.
 - a) Uses: Chemical Treatment for chilled water and hot water space heating
- 2) Schedule 40 Mechanical Grooved Pipe:
 - a) Uses: Chilled water and hot water space heating.
- 3) Schedule 80 Black Steel Pipe meeting requirements of ASTM A53/A53M, Type F, Weight Class XS.

b. Fittings:

- 1) Schedule 40 Black Carbon Steel Pipe: Standard weight wrought carbon steel meeting requirements of ASTM A234/A234M.
- 2) Schedule 40 Mechanical Grooved Pipe: Fittings by Victaulic.
- 3) Schedule 80 Black Steel Pipe: 300 psi (2.07 MPa) Welded.

c. Connections:

- 1) Less than One inch (25 mm): Threaded.
- 2) One to 2-1/2 inches (25 to 64 mm):
 - a) Screwed.
 - b) Roll grooved by Victaulic.
- 3) 2-1/2 inch (64 mm) And Larger:
 - a) Welded.
 - b) Roll grooved system by Victaulic.
- 4) Gaskets For Roll Grooved Joints:
 - a) Class Two Quality Standards:
 - b) Victaulic Grade E, EPDM, temperature rated minus 30 deg F to 230 deg F (minus 34 deg C to 110 deg C).
 - c) Equal as approved by Architect before installation. See Section 01 6200.

2. Propylene Glycol:**a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.**

- 1) Dow Frost by Dow Chemical.

3. Valves:**a. Ball Valves:**

- 1) Designed for shut off service.
- 2) High temperature service type rated at 150 deg F (66 deg C) steam working pressure and 350 deg F (177 deg C) maximum temperature.
- 3) Three piece swing out bronze body construction with full port, screwed end connections, and teflon seats.
- 4) Provide extended stem on insulated line.
- 5) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) ConBraCo Apollo: 82-100.
 - b) Hammond: 8604.
 - c) Milwaukee: BA-300.
 - d) Nibco: T595-Y.
 - e) Victaulic: Series 726.
 - f) Watts: B6800.

PART 3 - EXECUTION**3.1 INSTALLATION****A. Piping:**

1. Use either steel or copper pipe and fittings, but not both.
2. Use teflon tape and pipe dope for lubricating threads on all threaded connections. To join copper pipes, apply flux, heat joints to remove excess flux and solder, and cool joints in accordance with Manufacturer's recommendations.

3. Install unions on downstream side of shut-off valves, specialty valves, and meters, and on both sides of coils, baseboard units, and other heating equipment. Also install unions on both ends of radiation piping where piping goes from floor level into steel pipe troughs in floor slab.
4. Anchor or hang piping so pipe weight does not rest on flexible connectors.
5. Install roll grooved systems in accordance with Manufacturer's requirements.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Subject hydronic piping systems, in sections or entirety, to water pressure of 125 psig (862 kPa) and prove tight for period of four hours. Disconnect equipment not suitable for 125 psig (862 kPa) pressure from piping system during test period.

3.3 CLEANING

- #### A. Remove and clean strainers, including those at air separators and suction diffusers, before preliminary balancing of each water system and before final balancing of each water system.
- #### B. Cleaning of Hot Water Heating System Piping:
1. Give Architect seven days written notice of date of cleaning procedures.
 2. Hot Water Heating System:
 - a. After it has been determined system is tight and has been flushed, heat system water to 160 deg F (71 deg C) and circulate for 24 hours.
 - b. After cleaning, drain system, clean strainers, fill with fresh water, and thoroughly flush until pH of water is 8.

END OF SECTION

SECTION 23 3001**COMMON DUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General procedures and requirements for ductwork.
 - 2. Repair leaks in ductwork, as identified by duct testing, at no additional cost to Owner.
- B. Related Requirements:
 - 1. Section 01 4546: 'Duct Testing, Adjusting, and Balancing' for ductwork.
 - 2. Section 23 0501: 'Common HVAC Requirements'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
 - a. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (Third Edition).

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Manufacturer Instructions:
 - a. Installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Performance:
 - 1. Design Criteria:
 - a. Standard Ducts: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible'.
- B. Materials:
 - 1. Duct Hangers:
 - a. One inch (25 mm) by 18 ga (1.27 mm) galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches (2 400 mm) apart. Do not use wire hangers.
 - b. Attach threaded rod to steel joist with Anvil Steel washer plate Fig. 60. Double nut connection.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
- B. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
- C. Hangers And Supports:
 - 1. Install pair of hangers as required by spacing indicated in table on Drawings.
 - 2. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
 - 3. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
 - 4. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

3.2 CLEANING

- A. Clean interior of duct systems before final completion.

END OF SECTION

SECTION 23 3114**LOW-PRESSURE METAL DUCTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 4546: 'Duct Testing, Adjusting, And Balancing' for duct test, balance, and adjust air duct systems services provided by Owner.
 - 2. Section 23 0713: 'Duct Insulation' for thermal Insulation for ducts, plenum chambers, and casings.
 - 3. Section 23 3001: 'Common Duct Requirements'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
 - 2. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (Third Edition).
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-13, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM E84-14, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2. Underwriters Laboratories, Inc.:
 - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (2010 - Tenth Edition).

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Duct Sealer:
 - a. Meet Class A flame spread rating in accordance with ASTM E84 or UL 723.
 - b. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Duct Sealer:
 - a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
 - b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
 - c. Store in a cool dry location, but never under **35 deg F (1.7 deg C)** or subjected to sustained temperatures exceeding **110 deg F (43 deg C)** or as per Manufacturer's written recommendations.

- d. Do use sealants that have exceeded shelf life of product.

1.5 FIELD CONDITIONS

A. Ambient Conditions:

1. Duct Sealer:
 - a. Do not apply under **35 deg F (1.7 deg C)** or subjected to sustained temperatures exceeding **110 deg F (43 deg C)** or as per Manufacturer's written recommendations.
 - b. Do not apply when rain or freezing temperatures will occur within seventy two (72) hours.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Sheet Metal:
 - a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
2. Duct Sealer For Interior Ducts:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Duct Butter or ButterTak by Cain Manufacturing Co Inc, Pelham, AL www.cainmfg.com.
 - 2) DP 1010 or DP 1030 by Design Polymeric, Fountain Valley, CA www.designpoly.com.
 - 3) PROseal, FIBERseal, EVERseal, or EZ-seal by Ductmate Industries, Inc., Charleroi, PA www.ductmate.com.
 - 4) SAS by Duro Dyne, Bay Shore, NY or Duro Dyne Canada, Lachine, QB www.durodyne.com.
 - 5) Iron Grip 601 by Hardcast Inc, Wylie, TX www.hardcast.com.
 - 6) MTS100 or MTS 200 by Hercules Mighty Tough, Denver CO, www.herculesindustries.com.
 - 7) 15-325 by Miracle / Kingco, Div ITW TACC, Rockland, MA www.taccint.com.
 - 8) 44-39 by Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
 - 9) Airseal Zero by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
 - 10) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.

B. Fabrication:

1. General:
 - a. Straight and smooth on inside with joints neatly finished.
 - b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.
2. Standard Ducts:
 - a. General:
 - 1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
 - b. Rectangular Duct:
 - 1) Duct panels through 48 inch (**1 200 mm**) dimension having acoustic duct liner need not be cross-broken or beaded. Cross-break unlined ducts, duct panels larger than 48 inch (**1 200 mm**) vertical and horizontal sheet metal barriers, duct offsets, and elbows, or bead 12 inches (**300 mm**) on center.
 - a) Apply cross-breaking to sheet metal between standing seams or reinforcing angles.
 - b) Center of cross-break shall be of required height to assure surfaces being rigid.
 - c) Internally line square and rectangular drops. Externally insulate round drops.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Metal duct surface must be clean and free of moisture, contamination and foreign matter before applying duct sealer for interior and exterior ducts.

3.2 INSTALLATION

- A. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer as per Manufacturer's written instructions.
- B. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.
- C. Ducts shall not bear on top of structural members.
- D. Paint ductwork visible through registers, grilles, and diffusers flat black.
- E. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

3.3 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Air Test and Balance Testing as specified in Section 01 4546: 'Duct Testing, Adjusting, and Balancing'.
- B. Non-Conforming Work:
 - 1. Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

END OF SECTION

SECTION 23 3300**AIR DUCT ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: 'Common Duct Requirements'.

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 C1071-12, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)'.
 - c. ASTM C1338-14, 'Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings'.

PART 2 - PRODUCTS**2.1 ACCESSORIES**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. AGM Industries, Brockton, MA www.agmind.com.
 - b. Air Balance Inc, Holland, OH www.airbalance.com.
 - c. Air Filters Inc, Baltimore, MD www.afinc.com.
 - d. Air-Rite Manufacturing, Bountiful, UT (801) 295-2529.
 - e. American Warming & Ventilating, Holland, OH www.american-warming.com.
 - f. Arrow United Industries, Wyalusing, PA www.arrowunited.com.
 - g. Cain Manufacturing Company Inc, Pelham, AL www.cainmfg.com.
 - h. C & S Air Products, Fort Worth, TX www.csairproducts.com.
 - i. CertainTeed Corp, Valley Forge, PA www.certainteed.com.
 - j. Cesco Products, Florence, KY www.cescoproducts.com.
 - k. Daniel Manufacturing, Ogden, UT (801) 622-5924.
 - l. Design Polymerics, Fountain Valley, CA www.designpoly.com.
 - m. Ductmate Industries Inc, East Charleroi, PA www.ductmate.com.
 - n. Duro Dyne, Bay Shore, NY www.durodyne.com.
 - o. Dyn Air Inc. Lachine, QB www.dynair.ca
 - p. Elgen Manufacturing Company, Inc. East Rutherford, NJ www.elgenmfg.com
 - q. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com.
 - r. Greenheck Corp, Schofield, WI www.greenheck.com.
 - s. Gripnail Corp, East Providence, RI www.gripnail.com.
 - t. Hardcast Inc, Wylie, TX www.hardcast.com.
 - u. Hercules Industries, Denver, CO, www.herculesindustries.com.
 - v. Honeywell Inc, Minneapolis, MN www.honeywell.com.
 - w. Industrial Acoustics Co, Bronx, NY www.industrialacoustics.com.

- x. Johns-Manville, Denver, CO www.jm.com.
- y. Kees Inc, Elkhart Lake, WI www.kees.com.
- z. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com.
- aa. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
- bb. Metco Inc, Salt Lake City, UT (801) 467-1572 www.metcospiral.com.
- cc. Miracle / Kingco, Rockland, MA www.taccint.com.
- dd. Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
- ee. Nailor Industries Inc, Houston, TX www.nailor.com.
- ff. Owens Corning, Toledo, OH www.owenscorning.com.
- gg. Polymer Adhesive Sealant Systems Inc, Irving, TX www.polymeradhesives.com.
- hh. Pottorff Company, Fort Worth, TX www.pottorff.com.
- ii. Ruskin Manufacturing, Kansas City, MO www.ruskin.com.
- jj. Sheet Metal Connectors Inc, Minneapolis, MN www.smconnectors.com.
- kk. Tamco, Stittsville, ON www.tamco.ca.
- ll. Techno Adhesive, Cincinnati, OH www.technoadhesives.com.
- mm. Titus, Richardson, TX (972) 699-1030. www.titus-hvac.com
- nn. McGill AirSeal, Columbus, OH www.mcgillairseal.com.
- oo. United Enertech Corp, Chattanooga, TN www.unitedenertech.com.
- pp. Utemp Inc, Salt Lake City, UT (801) 978-9265.
- qq. Ventfabrics Inc, Chicago, IL www.ventfabrics.com.
- rr. Ward Industries, Grand Rapids MI www.wardind.com.
- ss. Young Regulator Co, Cleveland, OH www.youngregulator.com.

B. Materials:

1. Acoustical Liner System:

a. Duct Liner:

- 1) One inch (25 mm) thick, 1-1/2 lb (0.68 kg) density fiberglass conforming to requirements of ASTM C1071. Liner will not support microbial growth when tested in accordance with ASTM C1338.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) ToughGard by CertainTeed.
 - b) Duct Liner E-M by Knauf Fiber Glass.
 - c) Akousti-Liner by Manson Insulation.
 - d) Quiet R by Owens Corning.
 - e) Linacoustic RC by Johns-Manville.

b. Adhesive:

- 1) Category Four Approved Water-Based Products. See Section 01 6200 for definitions of Categories:
 - a) Cain: Hydrotak.
 - b) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
 - c) Duro Dyne: WSA.
 - d) Elgen: A-410-WB.
 - e) Hardcast: Coil-Tack.
 - f) Hercules: Mighty Tough Adhesives MTA500 or MTA600.
 - g) Miracle / Kingco: PF-101.
 - h) Mon-Eco: 22-67 or 22-76.
 - i) Polymer Adhesive: Glasstack #35.
 - j) Techno Adhesive: 133.
 - k) McGill AirSeal: Uni-tack.
- 2) Category Four Approved Solvent-Based (non-flammable) Products. See Section 01 6200 for definitions of Categories:
 - a) Cain: Safetak.
 - b) Duro Dyne: FPG.
 - c) Hardcast: Glas-Grip 648-NFSE.
 - d) Miracle / Kingco: PF-91.
 - e) Mon-Eco: 22-24.
 - f) Polymer Adhesive: Q-Tack.
 - g) Techno Adhesive: 'Non-Flam' 106.
- 3) Category Four Approved Solvent-Based (flammable) Products. See Section 01 6200 for definitions of Categories:

- a) Cain: HV200.
 - b) Duro Dyne: MPG.
 - c) Hardcast: Glas-Grip 636-SE.
 - d) Miracle / Kingco: PF-96.
 - e) Mon-Eco: 22-22.
 - f) Polymer Adhesive: R-Tack.
 - g) Techno Adhesive: 'Flammable' 106.
- c. Fasteners:
- 1) Adhesively secured fasteners not allowed.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AGM Industries: 'DynaPoint' Series RP-9 pin.
 - b) Cain.
 - c) Duro Dyne.
 - d) Gripnail: May be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.
2. Dampers And Damper Accessories:
- a. Locking Quadrant Damper Regulators:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Duro Dyne: KS-385.
 - b) Dyn Air: QPS-385.
 - c) Elgen: EQR-4.
 - d) Ventfabrics: Ventline 555.
 - e) Young: No. 1.
 - b. Concealed Ceiling Damper Regulators:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Cain.
 - b) Duro Dyne.
 - c) Elgen.
 - d) Metco Inc.
 - e) Ventfabrics: 666 Ventlok.
 - f) Young: 301.
 - c. Volume Dampers:
 - 1) Rectangular Duct:
 - a) Factory-manufactured 16 ga (1.6 mm) galvanized steel, single blade and opposed blade type with 3/8 inch (9.5 mm) axles and end bearings. Blade width 8 inches (200 mm) maximum. Blades shall have 1/8 inch (3 mm) clearance all around.
 - b) Damper shall operate within acoustical duct liner.
 - c) Provide channel spacer equal to thickness of duct liner.
 - d) Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, furnish with concealed ceiling damper regulator and cover plate.
 - e) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Air-Rite: Model CD-2.
 - (2) American Warming: VC-2-AA.
 - (3) Arrow: OBDAF-207.
 - (4) C & S: AC40.
 - (5) Cesco: AGO.
 - (6) Daniel: CD-OB.
 - (7) Greenheck: VCD-20.
 - (8) Nailor: 1810 or 1820.
 - (9) Pottorff: CD-42.
 - (10) Ruskin: MD-35.
 - (11) United Enertech: MD-115.
 - (12) Utemp: CD-OB.
3. Air Turns:
- a. Single thickness vanes. Double thickness vanes not acceptable.
 - b. 4-1/2 inch (115 mm) wide vane rail. Junior vane rail not acceptable.

- C. Fabrication:
1. Duct Liner:
 - a. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch (19 mm) long mechanical fasteners 12 inches (300 mm) on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
 - b. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
 - c. Coat longitudinal and transverse edges of liner with adhesive.
 2. Air Turns:
 - a. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
 - b. Quiet and free from vibration when system is in operation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Duct Liner:
1. Furnish and install acoustic lining in following types of rectangular ducts unless noted otherwise on Contract Documents:
 - a. Exhaust air.
 - b. Elbows, fittings, and diffuser drops greater than 12 inches (300 mm) in length.
 2. Do not install acoustic lining in round ducts.
- B. Dampers And Damper Accessories:
1. Install concealed ceiling damper regulators.
 - a. Paint cover plates to match ceiling tile.
 - b. Do not install damper regulators for dampers located directly above removable ceilings or in Mechanical Rooms.
 2. Provide each take-off with an adjustable volume damper to balance that branch.
 - a. Anchor dampers securely to duct.
 - b. Install dampers in main ducts within insulation.
 - c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
 - d. Where concealed ceiling damper regulators are installed, provide cover plate.

END OF SECTION

SECTION 23 3401**EXHAUST FANS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install exhaust fans as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: 'Common Duct Requirements'.
 - 2. Division 26: Control device and electrical connection.

1.2 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Bear AMCA seal and UL label.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
 - 1. Acme Engineering & Manufacturing Corp, Muskogee, OK www.acmefan.com.
 - 2. Broan-Nu Tone LLC, Harford, WI www.broan.com.
 - 3. Carnes Co., Verona, MI www.carnes.com.
 - 4. Loren Cook Co., Springfield, MO www.lorencook.com.
 - 5. Soler & Palau (S&P USA Ventilation Systems, LLC), Jacksonville FL www.solerpalau-usa.com.

2.2 MANUFACTURED UNITS

- A. Ceiling Mounted Exhaust Fans:
 - 1. Acoustically insulated housings. Sound level rating of 5.0 sones maximum for CFM and static pressure listed on Contract Drawings.
 - 2. Include chatterproof integral back-draft damper with no metal-to-metal contact.
 - 3. True centrifugal wheels.
 - 4. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
 - 5. Suitably ground motors and mount on rubber-in shear vibration isolators.
 - 6. Provide wall or roof cap, as required.
 - 7. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Acme: VQ.
 - b. Broan: LoSone.
 - c. Carnes: VCD.
 - d. Cook: Gemini.
 - e. Soler & Palau: FF.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor fan units securely to structure.

END OF SECTION

SECTION 23 3713**DIFFUSERS, REGISTERS, AND GRILLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: 'General Duct Requirements'.

1.2 SUBMITTALS

- A. Maintenance Material Submittals:
 - 1. Tools: Leave tool for removing core of each different type of grille for building custodian.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturer Contact List:
 - 1. Carnes Co, Verona, MI www.carnes.com.
 - 2. J & J Register, Grand Rapids, MI www.jandjreg.com.
 - 3. Krueger Air System Components, Richardson, TX www.krueger-hvac.com.
 - 4. Metal*Aire by Metal Industries Inc, Clearwater, FL www.metalaire.com.
 - 5. Nailor Industries Inc, Houston, TX or Weston, ON www.nailor.com.
 - 6. Price Industries Inc, Suwanee, GA www.price-hvac.com or E H Price Ltd, Winnipeg, MB (204) 669-4220.
 - 7. Titus, Richardson, TX www.titus-hvac.com.
 - 8. Tuttle & Bailey, Richardson, TX www.tuttleandbailey.com.

2.2 MANUFACTURED UNITS

- A. Ceiling Exhaust Grilles:
 - 1. Finish: Off-white baked enamel.
 - 2. 1/2 inch (12.7 mm) spacing.
 - 3. See Contract Documents for location of filter grilles.
 - 4. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Carnes: RSLA.
 - b. J & J: S90H.
 - c. Krueger: S85H.
 - d. Metal*Aire: SRH.
 - e. Nailor: 6155H.
 - f. Price: 535.
 - g. Titus: 355RL or 355 RS.
 - h. Tuttle & Bailey: T75D.
- B. Floor Return Grilles:
 - 1. Finish: Clear anodized.

2. Construction: Aluminum, reinforced for floor use.
3. Frame: 1 inch flange, mitered corners, spring clip fastening.
4. Core: Minimum 3/16 bars at 1/2" spacing. Support bars at 6" O.C., removable retainer clips.
5. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Carnes: CCJB (with mitered corners welded on face and sanded).
 - b. J & J: 2500 with Frame 10.
 - c. Krueger: 1500F.
 - d. Metal*Aire: 2000F.
 - e. Nailor: 49-240-FN-MM.
 - f. Price: LBPH-25B.
 - g. Titus: CT-540.
 - h. Tuttle & Bailey: 4000 CO.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

END OF SECTION

SECTION 23 8233**CONVECTORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Convectors.
- B. Related Requirements:
 - 1. Section 23 0501: 'Common HVAC Requirements'.
 - 2. Section 23 2113: 'Hydronic Piping' for convector and self-contained valve installation.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
 - a. Airtherm Manufacturing Co, Sunset Hills, MO www.airthermhvac.com.
 - b. Dunham-Bush Inc, West Hartford, CT www.dunham-bush.com.
 - c. Sterling Hydronics, Westfield, MA www.sterlingheat.com.
 - d. Slant / Fin Corp, Greenvale, NY www.slantfin.com.
 - e. Trane Co, La Crosse, WI www.trane.com or Trane Canada, Mississauga, ON (905) 676-9000.
- B. Convectors:
 - 1. Size using Commercial Standard CS-140-47 and include rating in catalog literature.
 - 2. Enclosures:
 - a. Constructed of 18 ga (0.048 in) (1.21 mm) first grade furniture steel.
 - b. With 16 ga (0.064 in) (1.52 mm) removable front panels.
 - c. With baked enamel finish, color as selected by Architect.
 - d. Provide manual damper and semi-recessed intake grille.
 - 3. Heating Elements:
 - a. Seamless copper tubes hydraulically expanded to flat aluminum fins to form permanent bond between tube and fin.
 - b. Silver solder tubes to cast iron header.

2.2 ACCESSORIES

- A. Self-Contained Valves:
 - 1. Provide with valve mounted adjustment and remote sensor with security guard as required.
 - 2. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a. Model RA-2000 by Danfoss Automatic Controls, Baltimore, MD www.danfoss.com or Mississauga, ON (905) 676-6000.
 - b. Tour & Anderson Model RVT by Victaulic, Easton, PA www.tahydronics.com or Mississauga, ON (905) 670-9015.

2.3 SOURCE QUALITY CONTROL

- A. Field Tests:

1. Test complete unit to withstand hydrostatic pressure test of 150 psi (1.03 MPa).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Convectors: Anchor units securely in place.
- B. Self-Contained Valves: Install on new radiation in building.

END OF SECTION

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.
 - 4. Furnish and install Penetration Firestop Systems at electrical system penetrations as described in Contract Documents.

- B. Products Furnished But Not Installed Under This Section:
 - 1. Anchor bolts and templates for exterior lighting equipment bases.

- C. Related Requirements:
 - 1. Section 07 8400: Quality of Penetration Firestop Systems to be used on Project and submittal requirements.
 - 2. Section 31 2316: Criteria for performance of excavating.
 - 3. Section 31 2323: Criteria for performance of backfilling.

1.2 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 2726: Wiring devices / Lighting control / Dimming equipment.
 - 2) Section 26 2816: Enclosed switches and circuit breakers.
 - c. Do not purchase equipment before approval of product data.

- B. Informational Submittals:
 - 1. Test And Evaluation Reports: Report of site tests, before Substantial Completion.

- C. Closeout Submittals:
 - 1. Operations And Maintenance Manual Data:
 - a. Modify and add to requirements of Section 01 7000 as follows:
 - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
 - 2) Provide in addition to product data required for Section 26 5100 interior lighting fixtures, tabulation for each tritium exit sign installed on Project including following:
 - a) Serial number.
 - b) Expiration date.

- c) Installed building location (example – chapel north rear exit, north corridor east end, main west foyer, etc.).
- 3) Include copy of approved shop drawings.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 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.

1.4 OWNER'S INSTRUCTIONS

- A. Provide competent instructor for three days to train 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.

1.5 SCHEDULING

- A. Include detailed sequence of individual electrical demolition operations on Construction Schedule specified in Section 01 3200.
- B. Coordinate with Owner for equipment and materials to be removed by Owner.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Performance:
 - 1. Design Criteria:
 - a. Materials and equipment provided under following Sections shall be by same Manufacturer:
 - 1) Section 26 2816: Enclosed Switches And Circuit Breakers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.
- B. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

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.
- B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

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.

END OF SECTION

SECTION 26 0519**LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of conductors used on Project except as excluded below.
- B. Related Requirements:
 - 1. Section 23 0933: Conductors and cables for temperature control system.
 - 2. Section 26 0501: Common Electrical Requirements.

1.2 REFERENCES

- A. Definitions:
 - 1. Line Voltage: Over 70 Volts.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Line Voltage Conductors:
 - 1. Copper with AWG sizes as shown:
 - a. Minimum size shall be No. 12 except where specified otherwise.
 - b. Conductor size No. 8 and larger shall be stranded.
 - 2. Insulation:
 - a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg C).
 - b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg C).
 - c. Higher temperature insulation as required by NEC or local codes.
 - 3. Colors:
 - a. 208Y / 120 V System:
 - 1) Black: Phase A.
 - 2) Red: Phase B.
 - 3) Blue: Phase C.
 - 4) Green: Ground.
 - 5) White: Neutral.
 - b. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
 - c. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.
- B. Line Voltage Cables:
 - 1. Metal Clad Cable (MC) may be used as restricted below:
 - a. Copper conductors
 - b. Sizes #12 through #8
 - c. Use only in indoor dry locations where:
 - 1) Not subject to damage.
 - 2) Not in contact with earth.
 - 3) Not in concrete.

- C. Standard Connectors:
1. Conductors No. 8 And Smaller: Steel spring wire connectors.
 2. Conductors Larger Than No. 8: Pressure type terminal lugs.
 3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
1. Conductors and cables shall be continuous from outlet to outlet.
 2. Do not use direct burial cable.
- B. Line Voltage Conductors:
1. Install conductors in raceway where indicated on Drawings. Run conductors of different voltage systems in separate conduits.
 2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Drawings.
 3. Neutrals:
 - a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
 - b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
 - c. Run separate neutrals for each circuit where specifically noted on Drawings.
 - d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs so neutral conductors will carry only unbalanced current. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
 4. Pulling Conductors:
 - a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
 - b. Do not use heavy mechanical means for pulling conductors.
 - c. Use only listed wire pulling lubricants.
- C. Line Voltage Cables:
1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
 2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
 3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
 4. Conceal cables within ceilings and walls of finished areas. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
 5. Install exposed cables parallel to or at right angles to building structure lines.
 6. Keep cables **6 inches 150 mm** minimum from hot water pipes.
 7. Do not support cables from mechanical ducts or duct supports without Architect's written approval.
 8. Prohibited procedures:
 - a. Boring holes for installation of cables in vertical truss members.
 - b. Notching of structural members for installation of cables.

END OF SECTION

SECTION 26 2726**WIRING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wiring devices complete with plates as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS**2.1 COMPONENTS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cooper Wiring Devices, Peachtree City, GA www.cooperwiringdevices.com.
 - b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
 - c. Hubbell Building Automation, Austin, TX www.hubbell-automation.com.
 - d. Hubbell Inc, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (800) 263-4622 or (905) 839-4332.
 - e. Hunt Control Systems Inc, Fort Collins, CO www.huntdimming.com.
 - f. Intermatic Inc, Spring Grove, IL www.intermatic.com.
 - g. Leviton Manufacturing Co, Little Neck, NY www.leviton.com or Leviton Manufacturing of Canada Ltd, Pointe-Claire, QB (800) 461-2002 or (514) 954-1840.
 - h. Lightolier Controls, Dallas, TX www.lolcontrols.com or Lightolier CFI, Lachine, QB (800) 565-5486 or (514) 636-0670.
 - i. Lutron Electronics Co Inc, Coopersburg, PA www.lutron.com.
 - j. Novitas Inc, Peachtree City, GA www.novitas.com.
 - k. Ortronics, New London, CT www.ortronics.com.
 - l. Paragon Electric Co Inc, Carol Stream, IL www.icca.invensys.com/paragon or Paragon Electric, Mississauga, ON (800) 951-5526 or (905) 890-5956.
 - m. Pass & Seymour, Syracuse, NY www.passandseymour.com or Pass & Seymour Canada Inc, Concord, ON (905) 738-9195.
 - n. Red Dot div of Thomas & Betts, Memphis, TN www.tnbcom.
 - o. Siemon Company, Watertown, CT www.siemon.com.
 - p. Square D Co, Palatine, IL www.squared.com.
 - q. Suttle, Hector, MN www.suttleonline.com.
 - r. Tork Inc, Mount Vernon, NY www.tork.com.
 - s. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
 - 2. Product Options:
 - a. Faces shall be nylon where available.
 - b. Devices of single type shall be from same Manufacturer.
 - c. Devices are listed as white. Use white devices on light colored walls and brown on dark walls.
- B. Switches:
 - 1. Rectangular Face Designer Style:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) 20 AMP, single pole:

- a) Cooper: DECB120W.
- b) Hubbell: HBL2121WA.
- c) Leviton: 5621-2W.
- d) Pass & Seymour: 2621-W.
- e) Tork: 701A.

C. Receptacles:

- 1. Rectangular Face Designer Style:
 - a. 15 AMP, specification grade, back and side wired, self grounding.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper: 6262W.
 - 2) Hubbell: HBL2152WA.
 - 3) Leviton: 16252-W.
 - 4) Pass & Seymour: 26252-W.
- 2. Range Receptacle:
 - a. Three pole, four wire grounding, 125 / 250 V, NEMA 14-50R, 50 AMP complete with plate.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper: 1258.
 - 2) Hubbell: HBL9450A.
 - 3) Leviton: 279.
 - 4) Pass & Seymour: 3894.
- 3. Ground Fault Circuit Interrupter (GFCI):
 - a. 15 AMP, specification grade.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper: GF15W.
 - 2) Hubbell: GF5252WA.
 - 3) Leviton: 8599-W.
 - 4) Pass & Seymour: 1594-W.

D. Telephone Jacks:

- 1. Desk Type:
 - a. 4 conductor, screw terminals, voice grade.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper: 3532-4W.
 - 2) Leviton: 40249-W.
 - 3) Pass & Seymour: TPTE1-W.
 - 4) Suttle: 625B4-4-85.
- 2. Wall Type:
 - a. 4 conductor, screw terminals, voice grade.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper: 3521-4W.
 - 2) Leviton: 40257-W.
 - 3) Pass & Seymour: WMTE14-W.
 - 4) Suttle: 630AC4-85.
- 3. Module Type:
 - a. For use in data faceplates.
 - b. 8 conductor, punch-down, voice grade.
 - c. Type Two Acceptable Products:
 - 1) Siemon: MX3-F-U3-02
 - 2) Equal as approved by Architect before use. See Section 01 6200.

E. Data Jacks:

- 1. For use in data faceplates.
- 2. 8 conductor, punch-down T568B wiring configuration, CAT 6.
- 3. Type Two Acceptable Products:
 - a. Flat Jack: Siemon MX6-F02
 - b. Angled Jack: Siemon MX6-02
 - c. Equal as approved by Architect before use. See Section 01 6200.

F. Plates:

1. Standard Cover Plates:
 - a. Office / Occupied Areas:
 - 1) Nylon or high impact resistant thermoplastic.
 - 2) Color shall match wiring device.
 - b. All Other: Stainless Steel.
 - c. Ganged switches shall have gang plates.
 - d. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Cooper.
 - 2) Hubbell.
 - 3) Leviton.
 - 4) Pass & Seymour.
2. Data Faceplates:
 - a. Type Two Acceptable Products:
 - 1) Single Module: Siemon MX-FP-S-01-02.
 - 2) Two Modules: Siemon MX-FP-S-02-02.
 - 3) Equal as approved by Architect before use. See Section 01 6200.
3. Weatherproof In-Use Receptacle Covers:
 - a. NEMA 3R rated.
 - b. Cast aluminum.
 - c. Compatible with GFCI receptacles.
 - d. Complete with weather resistant gaskets and stainless steel screws.
 - e. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - 1) Hubbell: WP26MH, horizontal; WP26M, vertical.
 - 2) Intermatic: WP1010HMC, horizontal; WP1010MC, vertical.
 - 3) Red Dot: CKMG, horizontal; CKMGV, vertical.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Install devices flush with walls, straight, and solid to box.

END OF SECTION