project manual

THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS

Bonneville

SL Bonneville Stake

1535 East Bonneview Drive – Salt Lake City, Utah

Project Number: 5066107-19020101

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2150 south 1300 east, suite 500 • salt lake city, utah 84106
801•747•2451

mechanical engineer
David L. Jensen & Associates
547 West 500 South
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B L A N K P A G E

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BIDDING REQUIREMENTS

FOR SMALL PROJECTS (U.S.)

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INVITATION TO BID (U.S.)

1. CONTRACTORS INVITED TO BID THE PROJECT:

to be announced

2. PROJECT:

Bonneville
SL Bonneville Stake
Project Number: 5066107-19020101

3. LOCATION:

1535 East Bonneview Drive
Salt Lake City, UT

4. OWNER:

Corporation of the Presiding Bishop of
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Bryan Stephenson
Meetinghouse Project Management Office
50 E North Temple Street, COB12
Salt Lake City, UT 84150-0012

5. CONSULTANT:

Bradley Gygi Architect & Associates, PLLC
2150 South 1300 East, Suite 500
Salt Lake City, UT 84106

6. DESCRIPTION OF PROJECT:

A. Interior plumbing piping replacement and repairs, interior finishes.

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 45 calendar days and will be as noted in the Agreement.

9. BID OPENING: Sealed bids will be received at date, time and place. Bids will be publicly opened at date, time and place.

10. BIDDING DOCUMENTS:

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

1) Dodge Data and Analytics
Office # (859) 885-1091
Fax # (801) 606-7722
email: sherry.roe@construction.com

Steps for downloading from McGraw-Hill Dodge:
Purchasing Individual Reports/Plans/Specs/Addenda from Dodge Data and Analytics

- Access the web-page http://dodgeprojects.construction.com/
- Search the Dodge Database by state (required) using the Dodge Report Number or Project Name for a single project report. To see a listing of all of the LDS projects in a particular state, enter the State name from the drop down box and then enter LDS in the second search box. Click Search.
- Select the project from the results list. By clicking on the blue project description, a more descriptive title will help to make sure you are purchasing the correction documents.
- When you find the correct project, select: Get This Report, Get Plans & Specs, or Monthly Access. Add to Cart and Proceed to Checkout or Continue Shopping. After the purchase, select View This Project.

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

Hard copy plans are available for viewing at:

- Mountainlands Area Plan Room
583 West 3560 South, Suite 4
Salt Lake City, UT 84115

Plans can also be viewed online with Mountainlands at: www.MAPRonline.com

- Membership is required for online service.

B. Hard Copy and electronic copy Bidding Documents will be provided to invited Contractors. Hard Copies shall be returned to the Architect complete and in good condition within five days of bid opening.

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

12. OWNER'S RIGHT TO REJECT BIDS: 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. DOCUMENTS:

A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
   1) Agreement Between Owner and Contractor for Small Project (U.S.)
   2) Other documents included by reference
   3) Addenda.

B. Bidding Requirements are those documents identified as such in proposed Project Manual.

C. Addenda are written or graphic documents issued prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Agreement Between Owner and Contractor for Small Project (U.S.) upon execution of the Agreement by Owner.

2. BIDDER'S REPRESENTATIONS:

A. By submitting a bid proposal, bidder represents that
   1) Bidder has carefully studied and compared 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 contract work, and has correlated its personal observations with requirements of proposed Contract Documents, and
   3) Bid is based on materials, equipment, and systems required by Bidding Documents without exception.

3. BIDDING DOCUMENTS:

A. Copies
   1) Owner will provide the Bidding Documents as set forth in the Invitation to Bid.
   2) Partial sets of Bidding Documents will not be issued.

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) Equal products may be approved upon compliance with Contract Document requirements.
   2) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding documents.
   3) Where a specified product is identified as a "quality standard", products of other manufacturers that meet the performance, properties, and characteristics of the specified "quality standard" may be used without specific approval as a substitute.

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) Bid will be complete and executed by authorized representative of Bidder.
3) Do not delete from or add to the information requested on bid form.

B. Submission of Bids
1) Submit bid in sealed opaque envelope containing only bid form.
2) It is bidder's sole responsibility to see that its bid is received at or before the specified time. Bids received after specified bid opening time may be returned to bidders unopened.
3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

C. 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. Acceptance Of Bid
1) No bidder will consider itself under contract after opening and reading of bids until Owner accepts Contractor's Bid Proposal by executing same.
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. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Agreement Between Owner and Contractor for Small Project (U.S.)" provided by Owner.

7. MISCELLANEOUS:

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

B. Examination Schedule for Existing Building and Site
1) Contractor may arrange additional visits by Contractor or subcontractors with FM Manager. Contact information will be provided at the Pre-Bid Conference.

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. Geotechnical Report -
   1) Not provided for this project.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material. Owner will provide a report to the Contractor to maintain on site during construction activities.
B. Refer to Section 01 3500, Article 1.3 “Environmental Procedures” for requirements to be followed.

END OF DOCUMENT

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BID FORM

FOR GENERAL CONTRACT WORK (U.S.)

PROJECT IDENTIFICATION:

Bonneville, SL Bonneville Stake, 5066107-19020101

OWNER:

Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner")
Bryan Stephenson, Meetinghouse Project Management Office
50 E North Temple Street, COB12, Salt Lake City, UT 84150-0012

CONSULTANT:

Bradley Gygi Architect & Associates, PLLC
2150 South 1300 East, Suite 500, Salt Lake City, UT 84106

BID

1. In submitting this Bid, Bidder represents that:
   a. If this Bid is accepted, Bidder will enter into an agreement with Owner to perform and furnish the Work described in the Bidding Documents for the Bid Price and within the Time of Substantial Completion indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
   b. Bidder has carefully examined the Bidding Documents consisting of the Project Manual containing the Bidding Requirements, the Conditions of the Contract, and the Specifications, entitled Bonneville, the Drawings entitled Bonneville and dated 30 Sept 2019 and including sheets numbered G001 through P501 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.

RESPECTFULLY SUBMITTED:

_____
Signature

_____
Printed name

_____
Title

_____
Company name

_____
Business Address

_____ _____
Date City, State, and Zip Code

_____ _____
License No. Telephone Fax

_____
Contact Email Address

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

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

Building Name: Bonnevile

Building Plan Type: Non Standard

Building Address: 1535 East Bonneview Drive, Salt Lake City, UT

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

Project Number: 5066107-19020101

Completion Date:

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

Project Consultant and Principal in Charge (signature) Date

Bradley Gygi Architect & Associates, PLLC
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

B L A N K P A G E

SMALL PROJECT AGREEMENT
BETWEEN OWNER AND CONTRACTOR (U.S.)

Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole, ("Owner") and _____ ("Contractor") enter into this *Small Project Agreement Between Owner and Contractor (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 Work.** Contractor will furnish all labor, materials, tools, and equipment necessary to complete the Work in accordance with the Contract Documents. The Work is all labor, materials, tools, equipment, construction, and services required by the Contract Documents (the "Work").

3. **Contract Documents.** Contract Documents consist of:
   a. This Agreement;
   b. Supplementary Conditions for Small Project Agreement Between Owner and Contractor (U.S.);
   c. The Specifications (Division 01 and Divisions _____);
   d. Drawings entitled and dated _____;
   e. Addendum No. with date(s) _____;
   f. All written Field Changes, written Construction Change Directives and written Change Orders when prepared and signed by Owner and Contractor.

4. **Compensation.** Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the sum of _____ Dollars ($_____) (the "Contract Sum"). This Contract Sum includes all labor, materials, equipment, tools, costs, expenses, work and services of Contractor and its subcontractors necessary to perform the Work in accordance with the terms of this Agreement, including without limitation travel, communications, and copying costs.

5. **Payment.**
   a. If the Contract Sum is over $100,000 or if otherwise requested by Owner, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner will be used as a basis for reviewing Contractor's payment requests.
   b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within thirty (30) days after Owner receives:
      1) Contractor's payment request for work to date;
      2) a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
      3) releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.
      4) updated Construction Schedule.
   c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.
   d. Contractor will timely pay subcontractors their portion of fees and expenses that Owner has paid to Contractor.

6. **Extras and Change Orders.** Owner may order changes in the Work by altering, adding to, or deducting from the Work. In the event of such a change, the Contract Sum and/or the time of completion will be adjusted to reflect the change by means of a written Change Order signed by Contractor and Owner. Contractor will not

commence work on any change until either: (a) Contractor and Owner have executed a Change Order; or (b) Owner has issued a written order for the change acknowledging that there is a dispute regarding the compensation adjustment relating to the change. If Contractor proceeds with a change in the Work without complying with the preceding sentence, Contractor agrees that it will not be entitled to any additional compensation for such change.

7. **Warranty and Correction of Work.** For all Work, services, labor, materials, products, and equipment provided under the Contract Documents, Contractor provides and extends to Owner all statutory, common law, and standard industry warranties as well as those warranties set forth in Owner's Contract Documents. Unless a longer period is specified by Owner's Contract Documents or otherwise, Contractor, at a minimum and in addition to all other warranties, warrants all Work under the Contract Documents for at least one year. Specifically, and without limitation, Contractor will promptly correct at its own expense:
   a. any portion of the Work which
      1) fails to conform to the requirements of the Contract Documents, or
      2) is rejected by the Owner as defective or because it is damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
   b. any defects due to faulty materials, equipment, or workmanship which appear within a period of one year from the date of completion of the Work or within such longer period of time as may be prescribed by law or the terms of any applicable special warranty required by the Contract Documents.

8. **Time of Completion.** Contractor will complete the Work and have it ready for Owner's inspection within _____ (_____) calendar days from Notice to Proceed issued by Owner. Time is of the essence. If Contractor is delayed at any time in the progress of the Work by any act or neglect of Owner, or by changes in the Work, or by strikes, lockouts, unusual delay in transportation, unavoidable casualties, or acts of nature beyond Contractor's control, then the time for completion will be extended by the time that completion of the Work is delayed. However, Contractor expressly waives any damages for any such delays.

9. **Owner Provided Items.** Owner may provide furnishings, equipment, and/or other items for the Project. Contractor will install items furnished by Owner and/or receive, store, and protect such items on site until the date Owner accepts the Project.

10. **Product Requirements.** Contractor will provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Contractor will provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

11. **Permits, Surveys, and Taxes.** Contractor will obtain and pay for all permits and licenses, and also pay any applicable taxes. Contractor will also obtain and pay for any surveys it needs to perform the Work.

12. **Independent Contractor Relationship.** Contractor is not an agent or employee of Owner but is an independent contractor.

13. **Comply with Laws.** Contractor will comply, and ensure that all subcontractors comply, with all applicable laws, ordinances, rules, regulations, covenants, and restrictions.

14. **Indemnity and Hold Harmless.**
   a. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, liens, 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 or failure to perform 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 workers compensation acts, disability benefit acts, or other employee benefit acts.

15. **Work Restrictions.** Contractor will ensure that Contractor, its agents, employees, and subcontractors:
    a. Do not use or consume alcohol or cannabis, or illegally use drugs, on the Project Site or enter on or perform any Work on the Project Site while under their influence.
    b. Do not smoke or vape anything on the Project Site. Do not use tobacco in any form on the Project Site.
    c. Do not perform Work on the Project Site on Sundays except for emergency work.
    d. Refrain from using profanity or being discourteous or uncivil to others on the Project Site or while performing Work under this Agreement.
    e. Do not view or allow pornographic or other indecent materials on the Project Site.
    f. Do not play obnoxious and/or loud music on the Project Site. Do not play any music within existing facilities.
    g. Refrain from wearing immodest, offensive, or obnoxious clothing, while on the Project Site.
    h. Do not bring weapons on the Project Site.

16. **Safety Hazards.** Contractor will ensure that no work or services will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.

17. **Contractor's Insurance.** Prior to performing any work, Contractor will obtain and maintain during the term of this Agreement the following insurance:
    a. Workers Compensation Insurance or evidence of exemption.
    b. 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.
    c. 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:
        1) Limits of the greater of: Contractor's actual coverage amounts or the following:
            a) $2,000,000 General Aggregate;
            b) $2,000,000 Products - Comp/Ops Aggregate;
            c) $1,000,000 Personal and Advertising Liability;
            d) $1,000,000 Each Occurrence; and
            e) $50,000 Fire Damage to Rented Premises (Each Occurrence)
        2) Endorsements attached to the General Liability policy including the following or their equivalent:
            a) 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.
            b) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees, Or Contractors (Form B),

naming Owner and Architect as additional insureds.

d. Automobile Liability Insurance, with:
   1) Combined Single Limit each accident in the amount of no less than $500,000; and
   2) Coverage applying to "Any Auto" or its equivalent.

Contractor will provide evidence of these insurance coverages to Owner by providing an ACORD 25 (2010/05) Form or its equivalent: (1) listing Owner as the Certificate Holder and Additional Insured on the general liability and any excess liability policies, (2) 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), (3) attaching the endorsements set forth above for the Certificate of Liability Insurance, and (4) 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.) Notwithstanding the foregoing, Owner may, in writing and at its sole discretion, modify these insurance requirements.

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

19. **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 this 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

20. **Termination by Owner for Cause.** Should Contractor fail to timely provide Owner with the certificates of insurance, 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 this Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor, less any offsets. 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

21. **Termination by Owner for Convenience.** Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate this 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 Owner and/or its 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

22. **Enforcement.** In the event either party commences legal action to enforce or rescind any term of this Agreement, the prevailing party will be entitled to recover its attorney fees, costs and legal expenses, 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.

23. **Ownership of Materials, Products, and Intellectual Property Rights.** 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 and its subcontractors for products, services, and Work provided under this Agreement, such products, services, and Work of Contractor and its subcontractors constituting works made for hire. Neither Contractor nor its subcontractors will reuse any portion of such items provided by Owner or work products developed by Contractor or its subcontractors 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. Contractor shall obtain the written agreement of each of its subcontractors to the terms of this section prior to permitting the subcontractor to perform any services contemplated by this Agreement.

24. **Comply with Intellectual Property Rights of Others.** Contractor represents and warrants that no Work or services (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).

25. **Ownership and Use of Renderings and Photographs.** Renderings, photographs, and/or other images of or representing the services, Work, or any improvement on or relative to the Project Site, whether created before, during, or at completion of construction (and whether created by Owner, Contractor, or Contractor's subcontractors), are the property of the Owner. Contractor hereby transfers and assigns to Owner all ownership and intellectual property rights that Contractor and/or its subcontractors may have in and to all such renderings, photographs, and other images. The Owner reserves all rights including copyrights and other intellectual property rights to such renderings, photographs, and other images. No such renderings, photographs, or other images shall be used or distributed without written consent of the Owner.

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

27. **Confidentiality.** Contractor shall ensure that Contractor and its 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:

a. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
b. Any contracts, agreements, business plans, budgets or other financial information, renderings, photographs, and materials provided by Owner, relating to the Work or any improvement on the Project Site to the extent such has not been made available to the public by the Owner;
c. Any other information that is marked or noted as confidential at the time of its disclosure.

28. **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, or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:
    a. By referring to the Owner or 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 Work or 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 work, 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 Owner or Project.

    Notwithstanding the foregoing, Contractor may include a reference to Owner or the Project 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 or the Project is included with at least several other similar references to projects of different owners and is given no more prominence than such other references.

29. **Entire Agreement.** This Agreement contains the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, relating to the Project. This Agreement may be amended only by a writing signed by both parties. This Agreement will not be construed to create a contractual relationship of any kind between any persons or entities other than Owner and Contractor.

30. **Assignment.** Contractor will not assign any right or obligation hereunder without the prior written consent of the Owner, which consent may be granted or withheld in Owner's absolute discretion.

31. **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.

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

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

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SUPPLEMENTARY CONDITIONS

FOR SMALL PROJECT AGREEMENT BETWEEN OWNER AND CONTRACTOR (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.

2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

This section may be included as a separate additional paragraph to the Small Project Agreement Between Owner and Contractor (U.S.), at Owner's discretion:

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of Two Hundred dollars ($200.00) per day as liquidated damages for Owner's loss of use 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.

ITEM 3 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

UTAH STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

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 Small Project Agreement Between Owner and Contractor (U.S.):

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 Small Project Agreement Between Owner and Contractor (U.S.):

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 STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace paragraph 5 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. <u>Payment</u>

a. If the Contractor's Bid Proposal Amount is over $100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner, will be used as a basis for reviewing Contractor's payment requests.

b. Progress Payments: Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor progress payments for work completed within fifteen (15) days after Owner receives:
    1. Contractor's progress payment request for work to date;
    2. A certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
    3. Conditional Waiver and Release Upon Progress Payment documents submitted by Contractor (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.

c. Final Payment: Owner will make full and final payment of the Contract Sum due within thirty (30) days of the completion of all of the following requirements:
    1. Contractor has submitted its final payment request;
    2. Contractor has submitted a certification that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the final payment request; and
    3. Contractor has submitted 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.

    Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made to Owner in writing and identified by Contractor in its affidavit as still pending.
    If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

d. Owner may modify or reject any payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

e. 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.

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

g. No payment made, either in whole or in part, by Owner will be construed to be an acceptance of defective or improper materials or workmanship.

END OF DOCUMENT

B L A N K P A G E

DIVISION 01

SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

SECTION 01 1000 SUMMARY

A. Work Covered By Contract Documents:
   1. Provisions contained in Division 01 apply to all other sections and divisions of Specifications. All instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, all obligations set forth in Specifications are obligations of Contractor.
   2. Comply with applicable laws and regulations.
B. Work By Owner:
   1. Owner will furnish and install some portions of the Work with its own forces. Complete the Work necessary to accommodate the Work to be performed by Owner before scheduled date for performance of such Work.
   2. Owner may provide furnishings and/or equipment for Project. Contractor will receive, store, and protect such items on site until the date Owner accepts Project.

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

A. Separate Contracts:
   1. Contracts may be issued by Owner for performance of certain construction operations at Project site.
   2. 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:

SECTION 01 1400 WORK RESTRICTIONS

A. Project Conditions:
   1. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
      a. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
      b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
      c. Do not allow use of tobacco in any form on Project Site.
      d. Do not allow pornographic or other indecent materials on site.

e. Do not allow work on Project Site on Sundays except for emergency work.
f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
i. Do not build fires on Project Site.
j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

2. Existing Facilities:
   a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements:
   1. Coordination:
      a. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work.
      b. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation.
      c. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:
   1. Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

B. Project Meetings And Conferences:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect or Owner Representative 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, equipment deliveries, general inspection of tests, preparation of record documents and O&M manuals, project cleanup, security, shop drawings, samples, use of premises, work restrictions, and working hours.
   2. Pre-Installation Conferences.
      a. Attend pre-installation conferences specified in Contract Document.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Submittal Procedure:
   1. Coordination: Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
   2. Process Time: Allow sufficient review time so installation will not be delayed by time required to process submittals.
   3. Identification: Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
   4. Transmittal: Package each submittal appropriately for transmittal and handling.

      General:
      a. Transmit each submittal from Contractor to Architect using transmittal letter. Transmittal letter shall provide sufficient space for Architect review stamp and comments (5" wide x 3" high minimum space).

b. All submittals shall 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.
c. Submittals received from sources (both electronic and physical sources) other than Contractor or not marked with Contractor's approval will be returned without action.

Electronic Submittals:
d. Preferred method of transmittal for most submittals previously in paper format is via email attachment to Architect in .pdf format.
e. Maintain original size of .pdf files submitted from subcontractors (24"x36" drawings shall remain original size in electronic format, for example).
f. Electronic submittals shall be submitted as a single file (.pdf) per submittal item / discipline.
g. Do not submit multiple files, cut sheets, product information, etc.
h. Contractor shall compile each submittal including transmittal letter as first page of each submittal.
i. Contractor shall submit each submittal item / discipline in a separate email, not multiple submittals in a single email.
j. Subject line of submittal email shall include project name and submittal title / category.

Physical Submittals:
k. Submittals requiring hard copies or including physical product samples shall be delivered or shipped to Architect's office. Deliveries are accommodated from 8:30am to 4:30pm Monday through Friday on regular business days.
l. Package each submittal appropriately for transmittal and handling. On transmittal, record relevant information and requests for data.

B. Action Submittals:
1. Product Data: Submit product data, as required by individual Sections of Specifications.
2. Shop Drawings: Submit shop drawings for review and designate (stamp) approval of shop drawings.
3. Samples: Samples used for comparison with actual component to be installed. Samples when accepted will be used for quality comparisons throughout course of construction.

C. Informational Submittals:
1. 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.
a. Return copies or PDF files marked with action taken and with corrections or modifications required.

D. Closeout Submittals:
1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

A. Quality Assurance:
1. Hot Work Permit (Available from Owner's Representative):
a. Required for doing hot work involving open flames or producing heat or sparks such as:
1) Brazing.
2) Cutting.
3) Grinding.
4) Soldering.
5) Thawing pipe.
6) Torch applied roofing.
7) Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Administrative Requirements:
1. Conflicting Requirements:
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.
2. Minimum Quantity or Quality Levels:

a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.

3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.

B. Quality Assurance:
1. 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.
2. Quality Assurance Services: 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. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

C. Quality Control:
1. Quality Control Services:
a. Quality Control will be sole responsibility of Contractor.
1) 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.
a) They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.
b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:
a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.

D. Repair And Protection:
1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

A. Qualifications: Qualifications in this Section establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Fabricator / Supplier / Installer Qualifications:
a. 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:
1) Where heading *'VMR (Value Managed Relationship) Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project. No other suppliers / installers will be acceptable. Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
2) Where heading 'Acceptable or Approved Suppliers / Installers / Fabricators' is used to identify list of specified suppliers / installers / fabricators, use only one of listed suppliers / installers / fabricators. No others will be acceptable.
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 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 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:
      1) 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 will be performed by entities who are recognized experts in those operations:
      1) Specialists will satisfy qualification requirements indicated and will be engaged for activities indicated.
      2) Requirement for special will 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.
   b. Testing Laboratory:
      1) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
      2) Cement and Concrete Reference Laboratory (CCRL).
      3) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
      4) 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.

SECTION 01 4523 TESTING AND INSPECTION SERVICES

A. Submittals:
   1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
   2. 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 to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
   3. Testing Agency:
      a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
      b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.

B. Quality Assurance:
   1. 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.

2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
3. Certification:
   a. 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.
   b. 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.
4. Written Practice for Quality Assurance:
   a. 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.
   b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

C. Quality Control:
1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, 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.
2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
   a. Testing and Inspection Reports will be distributed as follows:
      1) 1 copy to Owner's Representative.
      2) 1 copy to Architect.
      3) 1 copy to Consulting Engineer(s) (Engineer of Record).
      4) 1 copy to Authorities Having Jurisdiction (if required).
3. Contractor's Responsibility:
   a. 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.
   b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   c. 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:
      1) 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.
      2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   e. All Work is subject to testing and inspection and verification of correct operation.
   f. Comply:
      1) 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.
      2) Comply with Contract Documents in making such repairs.
   g. Data:
      1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
      1) 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.
      2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.

3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
5) 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.

i. Protection:
1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.

j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
4) Schedule sequence of activities to accommodate required services with minimum of delay.
5) Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.

k. Test and Inspection Log:
1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:
(a) Date test or inspection was conducted.
(b) Description of the Work tested or inspected.
(c) Date test or inspection results were transmitted to Architect or Owner Representative.
(d) Identification of Testing Agency or inspector conducting test or inspection.
2) Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's or Owner’s reference during normal working hours.

D. Tests And Inspections - General:
1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
a. 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.
b. Contractor must cooperate with persons and firms engaged in these activities.
4. 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 50.
5. Taking Specimens:
a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
6. Scheduling Testing Agency:
a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.

E. Testing Agency Services And Responsibility:
1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
2. Testing and Inspection Services:
a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
b. Testing Agency will not give direction or instruction to Contractor.

c. 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.
d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.

3. Testing Agency Duties:
   a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   d. 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.
   e. 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.
   f. 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.
   g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.
4. Testing and Inspection Reports:
   a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
   b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      1) Description of method of test.
      2) Identification of sample and portion of the Work tested:
         (a) Description of location in the Work of sample.
         (b) Time and date when sample was obtained.
         (c) Weather and climatic conditions at time when sample was obtained.
      3) Evaluation of results of tests including recommendations for action.
   c. Inspection Reports:
      1) Testing Agency will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections.
      2) 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.
   d. Reporting Testing and Inspection (Conforming Work):
      1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      1) 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:
         (a) 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).
         (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
   f. Final Report:
      1) Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

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

G. Field Quality Control:
   1. Field Tests And Inspections:

a. Field Test and Inspection requirements are described in detail in 'Field Quality Control' in Part 3 Execution' of individual Sections in Division 01 thru Division 49.

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

A. Administrative Requirements:
1. Contractor is responsible for security of materials, tools, and equipment. Do not permit others to use building keys provided by Owner. Safeguard building and contents while the Work is being performed and secure building when the Work is finished for day.
2. 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:
   a. Avoid use of tools and equipment that produce harmful noise.
   b. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near site.
   c. Protect the Work, materials, apparatus, and fixtures from injury due to weather, theft, and vandalism.
3. Existing restroom facilities may be used by Contractor. Clean restrooms and portions of existing building used in accessing restrooms daily. If existing facilities are not usable, provide and maintain temporary sanitary toilet.

B. Temporary Barriers And Enclosures:
1. Protect existing trees and plants. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
2. Erect adequate barricades, warning signs, and lights necessary to protect persons from injury or harm.
3. Provide temporary enclosures at exterior building openings for security and protection from weather, theft, and vandalism. Erect and maintain dust-proof partitions and enclosures as required to prevent spread of dust and fumes to occupied portions of building.
4. 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:
   a. 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.
   b. 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').
   c. 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.
   d. 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.
   e. 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.

C. Utilities:
1. Electrical Power: Owner will provide electric power for construction activities within limits available at existing facility.
2. Fire Protection: Exercise caution to avoid fire damage: Do not build fires on site.
3. Heating, Cooling, And Ventilation:
   a. Permanent mechanical system may be operated upon following conditions:
      1) Do not interfere with normal set-back temperature patterns except as approved by Project Manager.
      2) Do not operate system when the Work causing airborne dust is occurring or when dust caused by such Work is present without first installing temporary filtering system.
4. Lighting: Existing lighting system may be used by Contractor.
5. Water Service: Contractor will use existing water supply for construction purposes to extent of existing facilities.

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

A. Administrative Requirements:
   1. Provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are 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.

SECTION 01 6200 PRODUCT OPTIONS

A. 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 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 convenience to Contractor as 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 or Owner Representative by Addendum.
         2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect or Owner Representative 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 will conform to Contract Document requirements.

SECTION 01 6400 OWNER-FURNISHED PRODUCTS

A. Administrative Requirements:
   1. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

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

B. Delivery, Storage, and Handling:
   1. Delivery and Acceptable 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.
      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.
   2. 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 weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01 7000 EXECUTION REQUIREMENTS

A. Administrative Requirements:
   1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
      a. Notify Owner in writing of unsatisfactory conditions.
      b. Do not proceed until unsatisfactory conditions have been corrected.

B. Common Installation Provisions:
   1. Provide attachment and connection devices and methods necessary for securing the Work:
      a. Secure the Work true to line and level.
      b. Allow for expansion and building movement.
   2. Recheck measurements and dimensions before starting each installation.
   3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
   4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.

C. Protection:
   1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.

D. Completion Inspection:
   1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
   2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
   3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

A. Disposal Of Waste:

1. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:
    a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
    b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
2. Burning: Do not burn waste materials.
3. Disposal: Transport waste materials off Owner's property and legally dispose of them.

B. Progress Cleaning:
1. Keep premises broom-clean during progress of the Work.
2. 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.
3. Clean and maintain completed construction as frequently as necessary throughout construction period.
4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.

C. Final Cleaning:
1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

A. General:
1. 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.
2. 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.
3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.

B. Preliminary Closeout Review:
1. 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.
2. 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.
3. 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:
    a. Punch list of items requiring completion and correction will be created.
    b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

C. Substantial Completion Inspection:
1. 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.
2. 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.
3. 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:
    a. Date of Substantial Completion.

b. Punch List Work not yet completed, including seasonal and long lead items.
c. Amount to be withheld for completion of Punch List Work.
d. Time period for completion of Punch List Work.
e. 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.

4. 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.

D. Final Acceptance Meeting:
1. 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.
2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
a. 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.
b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
c. Final cleaning requirements have been completed.
3. 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.
4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

A. Administrative Requirements:
1. Project Record Documents:
a. Do not use record documents for construction purposes:
1) Protect from deterioration and loss in secure, fire-resistive location.
2) Provide access to record documents for reference during normal Working hours.
b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2) Mark new information that is important to Owner, but was not shown on Contract Drawings.
3) Note related Change Order numbers where applicable.
2. As Built Record Drawings:
a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to 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. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.

B. Operations And Maintenance Manual:
1. General:
a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
b. Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
2. Project Manual:
c. 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: (digital format only).
4. Operations and Maintenance Data (digital format only):
   a. Operations and maintenance submittals includies cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
5. Warranty Documentation: Digital format of final, executed warranties.
6. Record Documentation:
   a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
7. Software: Audio and Video System software, programming and set-files.
8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
9. Landscape Management Plan (LMP):
   a. Irrigation Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
   b. Landscaping Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.

C. Warranties:
1. 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.
2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

DIVISION 07: THERMAL AND MOISTURE PROTECTION

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 07 2116

BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install faced thermal and acoustic batt insulation as described in Contract Documents.
   2. Furnish and install unfaced thermal insulation in ceilings as described in Contract Documents.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for furnishing and installing of insulation in hollow metal door frames.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C665-17, ‘Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing'.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Insulation shall be manufactured and installed in compliance with International Building Code (IBC) or other applicable building codes.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Insulation:
      a. Type One Acceptable Manufacturers:
         1) Certainteed Corp, Valley Forge, PA www.certainteed.com.
         2) FiberTEK, Salt Lake City, UT www.fibertekinsulation.com.
         3) Guardian Fiberglass, Greer, SC www.guardianbp.com.
         4) Johns Manville, Denver, CO www.jm.com.
         5) Knauf Fiber Glass, Shelbyville, IN www.knaufusa.com.
         6) Owens-Corning Fiberglass Corporation, Toledo, OH www.owens-corning.com.
         7) Thermafiber, Wabash, IL www.thermafiber.com.
      b. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:
   1. Thermal And Acoustic Insulation:
      a. Order insulation by 'R' value rather than 'U' value, rating, or thickness, either 16 or 24 inches (400 or 600 mm) wide according to framing spacing.
      b. Faced Insulation:
         1) Kraft faced meeting requirements of ASTM C665, Type II, Class C.
         2) Foil faced meeting requirements of ASTM C665, Type III.

a) Class A: Exposed insulation.
b) Class B: Enclosed insulation.

c. Unfaced Insulation: Meet requirements of ASTM C665, Type I.
1) Support at trussed rafters:
a) Provide support at trussed rafters where insulation is not enclosed by structure or drywall.
b) Provide stings/wires which run perpendicular to framing and attach at each trussed rafter and to framing at 32 inches (800 mm) O.C. minimum and where batt ends adjoin each other.
or
c) Class Two Quality Standard: Simpson Strong Tie IS Insulation Supports with 14 gauge (1.89 mm) carbon steel, spring wire and mitered tips for 16 inch (400 mm) O.C. and 24 inch (610 mm) O.C. spacing.

d. 'R' Value Required:
1) Acoustically Insulated Ceilings:
a) Enclosed Spaces: Fill framed cavity with batt of appropriate thickness.
b) Unenclosed Spaces: R-19.
c) Unenclosed Spaces above Offices and Restrooms: R-30.

2) Thermally Insulated Ceilings / Roof:
a) R-38 Standard
3) Wood Wall Stud Framing:

R-11	3-1/2 inches deep	89 mm deep
R-19	5-1/2 inches deep	140 mm deep

2.2 ACCESSORIES SYSTEMS

A. Attic Baffles:
1. Design Criteria:
a. Baffle can be used with spray foam, loose-fill, fiberglass, or other insulation materials.
2. Type One Acceptable Manufacturers:
a. SB24 SmartBaffle by DCI Products, Inc., Clifton Heights, PA www.dciproducts.com.
b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Leave no gaps in insulation envelope.
2. If two layers of insulation are used to attain required 'R' value, only layer towards interior of building shall have facing.
3. Provide minimum clearance around recessed lighting fixtures as approved by local code.

B. In Framing:
1. Install insulation behind plumbing and wiring, around duct and vent line penetrations, and in similar places.
2. Fit ends of batts snug against top and bottom plates.
3. Fit batts snug against stud framing at each side.
4. Where insulation is not enclosed by structure or drywall, support in place with wire or other suitable material as approved by Architect before bid.

C. Attic Baffles:
1. Install in accordance with manufacturer's instructions.

2. Install baffles between trusses and rafters at ventilation spaces to prevent insulation from blocking airflow from soffit.
3. Install baffles to prevent insulation from blocking ventilation airflow from soffit.

END OF SECTION

B L A N K P A G E

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.

C. Products Furnished But not Installed Under This Section:
   1. Interior Ceramic Tile Joint Sealants:

D. Related Requirements:
   1. Section 09 3013: 'Ceramic Tiling'.

1.2 REFERENCES

A. Definitions:
   1. Sealant Types and Classifications:
      a. ASTM Specifications:
         1) Type:
            a) Type S: Single-component sealant.
            b) Type M: Multi-component sealant.
         2) Grade:
            a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
            b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
         3) Classes: Represent movement capability in percent of joint width.
            a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
            b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
            c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
            d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
         4) Use:
            a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
            b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
            c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
            d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.

e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

B. Reference Standards:
1. ASTM International:
a. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
c. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
e. ASTM D5893/D5893M-16, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
b. Manufacturer's literature for each Product.
c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
1. Certificates:
a. Manufacturer's Certificate:
1) Certify products are suitable for intended use and products meet or exceed specified requirements.
2) Certificate from Manufacturer indicating date of manufacture.
2. Manufacturers' Instructions:
a. Manufacturer's installation recommendations for each Product.
b. Manufacturer's installation for completing sealant intersections when different materials are joined.
c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.

2. Applicator Qualifications:
   a. Company specializing in performing work of this section.
   b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
   c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:
   1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

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 not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
   2. Follow Manufacturer’s temperature recommendations for installing sealants.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
      a. Manufacturer's standard warranty covering sealant materials.
      b. Applicator’s standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Dow Corning Corp., Midland, MI www.dowcorning.com.

b. Franklin International, Inc. Columbus, OH www.titebond.com.
c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
d. Laticrete International Inc., Bethany, CT www.laticrete.com.
e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. Design Criteria:
a. Compliance: Meet or exceed requirements of these standards:
1) ASTM C920: Elastomeric joint sealant performance standard.
2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
b. Comply with Manufacturer's ambient condition requirements.
c. Sealants must meet Manufacturer's shelf-life requirements.
d. Sealants must adhere to and be compatible with specified substrates.
e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.
2. Sealants At Exterior Sheet Metal And Miscellaneous:
a. Description:
1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
a) Flashings.
b) Gutters.
c) Penetrations in soffits and fascias.
d) Roof vents and flues.
e) Lightning protection components.
b. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning: 790 Silicone Building Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
3) Tremco: Tremsil 600 Silicone Sealant.
3. General Interior Sealants:
a. General:
1) Inside jambs and heads of exterior door frames.
2) Both sides of interior door frames.
3) Inside perimeters of windows.

4) Miscellaneous gaps between substrates.
b. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.
c. Non-Paintable Sealant (Installer Option A):
1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
b) Laticrete: Latasil Silicone Sealant.
c) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
d) Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
e) Tremco: Tremsil 200 Silicone Sealant.
f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.
d. Paintable Sealant (Installer Option B):
1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.
4. Sealants For Interior Joints:
a. General:
1) Countertops and backsplash to wall.
2) Sinks and lavatories to countertops.
3) Joints between plumbing fixtures and other substrates.
b. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
1) Ceramic tile inside corners.
2) Ceramic tile and paver tile joints.
c. Description:
1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.
d. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.
e. Color: As selected by Architect from Manufacturer's standard colors.
f. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
2) Laticrete: Latasil Tile and Stone Silicone Sealant.
3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
4) Tremco: Tremsil 200 Silicone Sealant.

2.2 ACCESSORIES

A. Bond Breaker Tape:
1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.

B. Joint Backing:
1. Comply with ASTM C1330.
2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
3. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner:
1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape:

1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate surfaces and joint openings are ready to receive Work.
      a. Verify each sealant is compatible for use with joint substrates.
      b. Verify joint surfaces are clean and dry.
      c. Ensure concrete surfaces are fully cured.
   2. Sealants provided shall meet Manufacturer's shelf-life requirements.
   3. Notify Architect of unsuitable conditions in writing.
      a. Do not proceed until unsatisfactory conditions are corrected.
   4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
   1. Remove existing joint sealant materials where specified.
      a. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface using manufacturer’s recommended joint preparation methods.
      b. Repair deteriorated or damaged substrates as recommended by Sealant Manufacturer to provide suitable substrate. Allow patching materials to cure.
   2. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer’s instructions:
      a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
      b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
      c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
      d. Primers:
         1) Primers enhance adhesion ability.
         2) Use of primers is not a substitution for poor joint preparation.
         3) Primers should be used always in horizontal application where there is ponding water.
   3. Field test joints in inconspicuous location.
      a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
      b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
   4. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:
   1. Prepare joints in accordance with ASTM C1193.
      a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer’s recommended instructions for joint preparation methods.
      b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
      c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:
   1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:
1. Apply silicone sealant in accordance with Manufacturer's instructions.
2. Do not use damaged or deteriorated materials.
3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
4. Apply primer where required for sealant adhesion.
5. Install sealants immediately after joint preparation.
6. Do not use silicone sealant as per the following:
   a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
   b. Below-grade applications.
   c. Brass and copper surfaces.
   d. Materials bleeding oils, plasticizers, and solvents.
   e. Structural glazing and adhesive.
   f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:
1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:
1. Install bond breaker where joint backing is not used or where backing is not feasible.
   a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:
1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
2. Fill joint opening to full and proper configuration.
3. Apply in continuous operation.
4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.4 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

3.5 FIELD QUALITY CONTROL

A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
1. Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
   a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
   b. For sealants applied between dissimilar materials, test both sides of joints.

2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

A. Remove masking tape and excess sealant.

B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

C. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

END OF SECTION

DIVISION 09: FINISHES

END OF TABLE OF CONTENTS

B L A N K P A G E

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.
   2. Furnish and install acoustical sealants as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9219: 'Acoustical Joint Sealants' for quality of acoustical sealants.
   2. Section 09 3013: 'Ceramic Tile' for installation of backerboard joint reinforcing.

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 C11-16, '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 C840-17, 'Standard Specification for Application and Finishing of Gypsum Board'.
      d. ASTM C1002-16, '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-14a, 'Standard Specification for Gypsum Board'.
      h. ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
      i. ASTM E119-16a, '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-216-16: '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. National Building Code of Canada / Underwriters Laboratories of Canada:
   a. CAN/ULC-S102: ‘Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (7th Edition).
5. 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 MANDATORY 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.pabcogypsum.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. Type X, 5/8 inch (15.9 mm).
c. Square edges.
d. Category Four Approved Manufacturer. See Section 01 6200 for definitions of Categories:
1) DensShield Fireguard Type X by Georgia Pacific.
2) GlasRoc Tilebacker Type X 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.
b) Ceilings: Galvanized DWFC-20.
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 / Surfacer 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. Mounting Accessories:
   1. Furring Channels: Apply with screws through flanges into each framing member.

D. 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.
   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 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'.
   2) 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'.
   3) 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'.
   4) Painted, Untextured Gypsum Board Surfaces, Except in Mechanical, Storage, And Utility Areas:
      a) GA-214 Level 5: 'All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over 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. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer’s recommendations, shall be applied to the entire surface. The surface shall be

smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

E. 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

B L A N K P A G E

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.
   2. Patch existing wall tile with new to closely match existing colors 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	1 = Normal	F = Fast-Setting

(Mastics)	2 = Improved	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 characteris-tics 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-17, '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-17, ‘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 B415-15, ‘Wood or Metal Studs, Mortar Bed Walls, Mortar Bed Floor, Ceramic Tile’.
   b. TCNA F111-15, ‘On-Ground or Above-Ground Concrete, Unbonded Mortar Bed, Ceramic Tile’.
   c. TCNA F115-15, ‘On-Ground Concrete, Ceramic Tile, Epoxy or Furan Grout’.
   d. TCNA W211-15, ‘Masonry or Concrete, Bonded Mortar Bed, Ceramic Tile’.
   e. TCNA W221-15, ‘Solid Backing, Mortar Bed, Ceramic Tile’.
   f. TCNA W244c-15, ‘Wood or Metal Studs, Cement Backer Board, Ceramic Tile’.
   g. 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. Schulter 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 square and 12 inches square:
a) Cove Base: External and internal corner pieces to match with bull-nosed top:
(1) 6 inches by 8 inches 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) Verify on site to match existing.
2) See Drawings for existing color notes.
2. Ceramic Tile:
a. Wall Tile:
1) Walls: 4-1/4 inches by 4-1/4 inches.
2) Category Four Approved Colors. See Section 01 6200 for definitions of Categories:
a) Verify on site to match existing.
b) See Drawings for existing color notes.

E. Materials:
1. Paver Tile:
a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
1) Porcealto Graniti by Daltile.
2. Wall Tile:
a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
1) Semi-Gloss or Matte by Dal-Tile.
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. 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.
5. Backer Board Joint Reinforcing: 2 inch (50 mm) wide glass fiber mesh tape.
6. 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: [Verify to match existing]

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: [Verify to match existing]

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: Mapelastic 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: Mapelastic 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: Mapelastic 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
Font	One Part **	- -	4 Part	- -
Showers	One Part **	- -	4 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 On Walls:
1. On Mortar Bed Over CMU:
   a. Apply mortar bed to required thickness of 3/8 inch (10 mm) minimum to 3/4 inch (19 mm).
   b. Properly cure before installing tile.
2. On Glass Mat Gypsum Tile Backer Over Framing:
   a. Embed fiberglass reinforcing tape at joints with mortar used to adhere tile.
3. Dampen dry backings as determined by environmental conditions and Manufacturer's recommendations to achieve cure.
4. Allow for sealant joints full height at room corners in wall tile. Insert temporary filler in expansion joints.
5. Install wall tile directly atop bull-nosed paver tile base.

G. 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.

H. 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.

I. 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.

J. 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

B L A N K P A G E

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 05 0503: 'Shop-Applied Metal Coatings' for quality of shop priming of steel and iron.
2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
3. Sections under 09 9000 heading ‘Paints and Coatings’.
   a. Pre-Installation conferences held jointly with Section 09 9001.
4. Divisions 22 and 23: Painting of plumbing and HVAC identification, refrigerant line insulation, and duct interiors.

1.2 REFERENCES

A. Definitions:
1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
2. Gloss Levels:
   a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level ‘1’	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level ‘2’	High side sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘3’	Traditional 'eggshell-like finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘4’	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level ‘5’	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level ‘6’	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level “7’	High gloss	More than 85 units at 60 degrees.

3. Properly Painted Surface:
   a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet (1.50 m) minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

B. Reference Standards:
1. The latest edition of the following reference standard shall govern all painting work:
   a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

b. MPI(r), 'Maintenance Repainting Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
   a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading ‘Paints and Coatings’.
   b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading ‘Paints and Coatings’.
   c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
2. In addition to agenda items specified in Section 01 3100, review following:
   a. Review Quality Assurance for Approval requirements.
   b. Review Quality Assurance Field Sample requirements.
   c. Review Submittal requirements for compliance for MPI Approved Products.
   d. Review Design Criteria requirements.
   e. Review Cleaning requirements.
   f. Review painting schedule.
   g. Review safety issues.
3. Review additional agenda items from Sections under 09 9000 heading ‘Paints and Coatings’.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
   a. Include following information for each painting product, arranged in same order as in Project Manual.
      1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
      2) Provide one (1) copy of ‘MPI Approved Products List’ showing compliance for each MPI product specified.
         a) MPI Information is available from MPI Approved Products List using the following link: http://www.paintinfo.com/mpi/approved/index.shtml.
      3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.

B. Informational Submittals:
1. Manufacturer Instructions:
   a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
2. Qualification Statement:
   a. Applicator:
      1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Record Documentation:
      1) Manufacturer’s documentation:
         a) Manufacturer's cut sheet for each component of each system.
         b) Schedule showing rooms and surfaces where each system was used.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approval:
   1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
   2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
   3. Master Painters Institute (MPI) Standards:
      a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
      b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.

B. Qualifications:
   1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
      a. Minimum five (5) years' experience in painting installations.
      b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
      c. Maintain qualified crew of painters throughout duration of the Work.
      d. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
   2. Deliver amount of materials necessary to meet Project requirements in single shipment.

B. Storage And Handling Requirements:
   1. Store materials in single place.
   2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
   3. Maintain storage area at 55 deg F (13 deg C) minimum.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for 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.
h. Color Levels:
    1) Color Level II:
        a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
        b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.

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 mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents.
   3. Metal reveals at ceiling access doors.
   4. 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

SECTION 09 9122

INTERIOR PAINTED CMU

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new and existing interior CMU 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. Rest Rooms and Custodial Rooms:
      a. New Surfaces: Use MPI(a) INT 4.2F Waterborne Epoxy Finish system.
      b. Previously Finished Surfaces: Use MPI(r) RIN 4.2E Waterborne Epoxy Finish system.
   2. All Other:
      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.
   3. 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 existing interior gypsum board and plaster surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: ‘Gypsum Board’ for:
      a. Priming new interior gypsum board surfaces to receive sheet wall covering system or texturing.
      b. Pre-installation conference.
   2. 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.
   3. 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. 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) Remaining Painted Surfaces: Gloss Level 5.

D. Materials:
1. Primers:
a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
2. Finish Coats:
a. 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 9124

INTERIOR PAINTED METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new and existing interior metal 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’.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. Ferrous Metal:
      a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
      b. Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system.
   2. Galvanized Metal:
      a. New Surfaces: Use MPI(a) INT 5.3J Latex Finish system
      b. Previously Finished Surfaces: Use MPI(r) RIN 5.3AH Latex Finish system.
   3. Aluminum:
      a. New Surfaces: Use MPI(a) INT 5.4E Waterborne Light Industrial Finish system.
      b. Previously Finished Surfaces: Use MPI(r) REX 5.4E Light Industrial Finish system.

C. Performance:
   1. Design 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. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. Primers:
      a. Ferrous Metal: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
      b. Galvanized Metal: MPI Product 134: ‘Primer, Galvanized, Water Based’.

c. Aluminum: MPI Product 95: 'Primer, Quick Dry, for Aluminum'.

2. Finish Coats: MPI Product 153: 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

A. General:
1. See appropriate paragraphs of Section 09 9001.
2. Systems specified are in addition to prime coats furnished under other Sections.

B. New Surfaces: 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. Existing Painted Surfaces:
1. 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.
2. 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.
3. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
4. Apply prime coat over entire surface to be painted.
5. Lightly sand entire surface.
6. Clean surface as recommended by Paint Manufacturer.
7. Apply finish coats.

END OF SECTION

SECTION 09 9125

INTERIOR PAINTED WOOD

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new and existing woodwork and wood floors not requiring transparent finish, 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.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. Systems:
      a. All Other:
         1) New Surfaces: Use MPI(a) INT 6.3T or U Latex Finish system.
         2) Previously Finished Surfaces: MPI(r) Rin 6.3U 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. Woodwork:
      a. Primer Coat: MPI Product 39, ‘Primer, Latex, for Interior Wood’ or MPI Product 45, ‘Primer Sealer, Alkyd, Interior’.
      b. Finish Coats: MPI Product 153, ‘Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)’.

PART 3 - EXECUTION

3.1 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. Interface With Other Work:
   1. Properly clean and paint light cove interiors before installation of light fixtures.
   2. Where back-priming is required, apply one (1) coat of primer.

C. New Surfaces:
   1. Spot prime nail holes, cracks, and blemishes before and after puttying.
   2. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.

D. Existing Painted Surfaces:
   1. 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 wood areas on woodwork.
   2. Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
   3. 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 08 1429: 'Interior Flush Wood Doors'.
   2. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

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.
      2) Performance standard: Owner provided sample will be sample of exsiting stained wood from project.

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

DIVISION 22: PLUMBING

B L A N K P A G E

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. Section 22 0548: 'Vibration And Seismic Control for Plumbing Piping and Equipment'.
   6. Division 26: 'Electrical' for raceway and conduit, unless specified otherwise, and line voltage wiring.
   7. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 MECHANICAL DEMOLITION

A. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
   1. Piping to be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Piping to be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
   3. Ducts to be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   4. Ducts to be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
   5. Equipment to be Removed: Disconnect and cap services and remove equipment.
   6. Equipment to be Removed and Reinstalled: Disconnect and cap services and remove, clean and store equipment; when appropriate, reinstall, reconnect and make equipment operational.
   7. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

1.3 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.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability 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) 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.

1.5 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.

1.6 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 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.

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 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.

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.
3. Furnish inserts for attaching hangers that are to be cast in concrete floor construction to Division 03 at time floors are poured.

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 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 of straight run.
    b. Provide 12 inch offset below roof line in each vent line penetrating roof.

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.

3. Sleeves through floors shall extend 1/4 inch 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.

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.

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
5/8 inch	4 to 5 inches
3/4 inch	6 inches
7/8 inch	8 to 12 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
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.

e. Riser Clamps For Vertical Piping:
   1) Type Two Acceptable Products:
      a) Anvil Fig. 261.
      b) Equals by Cooper B-Line.

f. Concrete Inserts:
   1) Individual Inserts:
      a) Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
      b) Type Two Acceptable Products:
         (1) Anvil Fig. 282.
         (2) Equals by Cooper B-Line.
   2) Continuous Inserts:
      a) Class Two Quality Standard: Equal to Unistrut P-3200 series.

g. 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. Interface With Other Work:

1. Furnish inserts for attaching hangers that are to be cast in concrete floor construction to Division 03 at time floors are poured.

B. 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) 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.
      e. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.
      f. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

END OF SECTION

B L A N K P A G E

SECTION 22 0548

VIBRATION AND SEISMIC CONTROL FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of and requirements for anchorage and seismic restraint systems and vibration isolation systems for plumbing piping and equipment.

B. Related Requirements:
   1. Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete'.
   2. Section 22 3423: 'Gas Domestic Water Heaters'.
   3. Furnishing and installing of seismic restraint and vibration isolation systems is by installer of equipment requiring such systems.
      a. Manufacturers of equipment specified to receive seismic restraint shall provide product data needed for calculation of seismic restraint needs. This information shall include, but not be limited to, equipment dimensions, dimensioned anchor points, operating weight, and center of gravity dimension.

1.2 REFERENCES

A. Association Publications:
   1. Federal Emergency Management Agency (FEMA) / Vibration Isolation and Seismic Control Manufacturers Association (VISCMA) / American Society of Civil Engineers (ASCE):
      a. FEMA 412, 'Installing Seismic Restraints For Mechanical Equipment' (December 2002).
   2. Vibration Isolation and Seismic Control Manufacturers Association (VISCMA):
      a. VISCMA 101-12, 'Seismic Restraint Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
      b. VISCMA 102-12, 'Vibration Isolation Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.

B. Definitions:
   1. Vibration Isolation: Vibration reduction in which an isolation system is placed between the source of unwanted vibration and an item which needs to be shielded from the vibration.

C. Reference Standards:
   1. American National Standards Institute / Sheet Metal And Air Conditioning Contractors' National Association:
      a. ANSI/SMACNA 001-2008, 'Seismic Restraint Manual: Guidelines For Mechanical Systems' (3rd Edition).
   2. American Society of Civil Engineers / Structural Engineering Institute:
      a. ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures'.
         1) Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.
   3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
      a. 2011 ASHRAE Handbook - HVAC Applications.
         1) Chapter 48, 'Noise and Vibration Control'.
         2) Chapter 55, 'Seismic- and Wind-Resistant Design'.
   4. ASTM International:
      a. ASTM A615/A615M-12, 'Standard Specification for Deformed & Plain Billet-Steel Bars for Concrete Reinforcement'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:

a. Restraint system and anchorage method to be used for each piece of equipment.
b. Seismic restraints and calculations for all flexible mounted equipment.
c. Vibration isolators and flexible couplings.
d. Clearly outlined procedures for installing and adjusting isolators, seismic bracing anchors, and snubbers.

2. Shop Drawings:
a. Show size, hanger length, and location of seismic restraints for piping and ductwork.
b. Show details for each isolator and seismic brace with snubbers proposed for specified equipment.
c. Show details for proposed structural steel frames and rails and for anchors to be used in conjunction with isolation of equipment.
d. Show locations of piping and ductwork restraints on installation and fabrication floor plans (not bid set of documents of floor plans), noting size and type of restraint to be used.
e. Show details of supports, hangers, anchorage, and bracing for isolated equipment as designed or proposed by professional engineer employed by Restraint Manufacturer and qualified with seismic experience in bracing for mechanical equipment. Shop drawings submitted for seismic bracing and anchors shall bear engineer's signed professional seal.
f. Include anchor bolt calculations, signed and stamped by registered engineer, showing adequacy of bolt sizing and type.
1) Calculations shall include anchor embedment, minimum edge distance and minimum center distance.
2) Design lateral forces shall be distributed in proportion to mass distribution of equipment.
3) Furnish calculations for anchors on restraint devices, cable, isolators, and on rigidly mounted equipment.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. System design and installation shall meet seismic requirements as defined in ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures' and applicable state and local codes in accordance with minimum restraint capability of 1.0 g.
2. All products must be California certified/approved and labeled:

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Type One Acceptable Manufacturers:
a. Amber / Booth Company, Houston, TX www.amberbooth.com.
b. Mason Industries Inc, Hauppauge, NY www.mason-ind.com.
c. Vibration Mountings and Control Inc, Bloomington, NJ (201) 838-1780.
d. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance:
1. Design Criteria:
a. Seismic Requirements: Mechanical equipment, piping, and ductwork shall be braced, snubbed, or supported to withstand seismic disturbances and remain operational.
b. Vibration Isolation Requirements: Isolate equipment from structure by means of resilient vibration and noise isolators.

C. Materials:
1. Isolation And Seismic Equipment:
a. Piping:
1) Restrain piping in accordance with ANSI/SMACNA 001 Seismic Restraint Manual, Chapter 4, Figures 4.11 to 4.19.
b. Equipment with Fixed Anchor or Support:
1) Restraint designed according to ASCE/SEI 7-10, Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.

2) Horizontal force factor for elements of structures:
   a) In addition, vertical force restraint requirement shall be computed at 1/2 value of horizontal forces.
   b) Restrain equipment not anchored directly to floors by cable system designed and furnished by Restraint Manufacturer.

2. Vibration Isolation Requirements:
   a. Unless otherwise noted, isolate plumbing equipment one horsepower and over from structure by means of resilient vibration and noise isolators in accordance with ASHRAE 'Handbook - HVAC Applications', Chapter 48, Table 47, 'Selection Guide for Vibration Isolation'.
   b. Design and install isolation equipment, hangers, connections, and other isolating devices to prevent transmission of vibration to structure from equipment and associated piping and ductwork.
   c. For floor-mounted equipment, use recommendations of Chapter 48, Table 47, 'Selection Guide for Vibration Isolation'.
   d. For roofs and floors constructed with open web joints, thin long span slabs, wooden construction and unusual light weight construction, evaluate equipment weighing more than 300 lbs to determine additional deflection of structure caused by equipment weight. Isolator deflection shall be 15 times additional deflection or deflection shown in Chapter 48, Table 47, 'Selection Guide for Vibration Isolation', whichever is greater.
   e. Under-Equipment Spring Isolators:
      1) Equal to Mason SSLFH earthquake motion restrained spring mounts with freestanding stable steel springs, leveling bolts, corrosion resistant finish, motion limiting design, uplift restraining bolts, and 1/4 inch ribbed neoprene noise stop pad.
      2) Isolators shall accept force in any direction up to 1.0 g without failure, and shall limit movement to 3/4 inch in any direction.
      3) Springs shall have 50 percent overload capacity.
      4) Size as required to achieve specified static deflection.
      5) Outer diameter of spring proper shall not be less than 0.08 inch of spring height when in loaded position.
   f. Overhead Support Spring And Rubber Hangers:
      1) Combination spring and neoprene hangers.
      2) Hanger bracket shall have 500 percent overload capability and shall allow up to 15 degree hanger rod misalignment without short-circuiting.
      3) Springs shall have 50 percent overload capacity.
      4) Provide seismic bracing as required.
   g. Isolate piping and ductwork in mechanical equipment room and piping and ductwork three supports away or 50 feet from other mechanical equipment, whichever is greater, from structure by means of vibration and noise isolators:
      1) Isolate suspended piping with combination spring and fiberglass hangers in supporting rods.
      2) Support floor-mounted piping directly on spring mounts.
   h. Isolate vertical pipe risers from structure using vibration and noise isolating expansion hangers having minimum rated deflection of four times anticipated pipe movement. Enclose in housing for fail-safe equipment.
   i. Incorporate flexible connectors in piping adjacent to reciprocating equipment.
   j. Incorporate flexible connections in ductwork adjacent to air-moving units.
   k. Elastomeric Isolator: Neoprene or high quality synthetic rubber with anti-ozone and anti-oxidant additives.
   l. Nuts, Bolts, And Washers: Electroplated zinc.
   m. Isolators Exposed To Weather: Cadmium plated and neoprene coated springs.
3. Seismic restraint equipment and resilient isolation devices shall be designed and furnished by single Manufacturer.

D. Finishes:
1. Clean and paint steel components:
   a. Thoroughly clean structural steel bases of welding slag and prime with zinc-chromate or metal etching primer.
   b. Etch and paint hot dipped galvanized steel components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolation Equipment:
   1. Mount vibration isolated equipment on rigid steel frames or concrete bases unless Equipment Manufacturer certifies direct attachment capability.
   2. Install snubbers with factory set clearances.
   3. Piping:
      a. Protect isolated and non-isolated piping 2-1/2 inches inside diameter and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motions.
      b. Locations shall be as scheduled and include, but not be limited to:
         1) At drops to equipment and at flexible connections.
         2) At 45 degree or greater changes in direction of pipe.
         3) At horizontal runs of pipe 30 feet maximum on center spacing.
         4) Gas piping shall have additional restraints as scheduled.
   4. Ductwork:
      a. Protect isolated and non-isolated rectangular ductwork 4 sq ft in cross-sectional area and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motion.
      b. Locations shall be determined by Seismic Restraint Manufacturer and include, but not be limited to:
         1) Horizontal runs of ductwork 30 feet maximum on center spacing.
         2) 45 degree or greater changes in direction of ductwork.
         3) Each end of duct runs and drops of equipment.
         4) Each flexible connection.

B. Vibration Isolation:
   1. Install piping and ductwork to prevent transmission of noise and vibration into structure.

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. Labels:
      a. Equipment Identification:
         1) Black formica, with white reveal when engraved.
         2) Lettering to be 3/16 inch high minimum.
   2. 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. Labels:
   1. Identify following items with specified labels fastened to equipment with screws (unless noted otherwise):
      a. Water Heaters.
   2. Engrave following data from Equipment Schedules on Drawings onto labels:
      a. Equipment mark.
      b. Room(s) served.
      c. Panel and breaker from which unit is powered.

B. 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 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	➡
Domestic Recirc Water	HW Recirc	➡

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 cold, hot and HW recirculation 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
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 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.
         c)
4. PP-R 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. Piping up to 1-1/4-inch Diameter:
      a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
      b. Adhere 3-inch wide self-sealing butt joint strips over end joints.
   4. Piping 1-1/2 inches Diameter And Larger:
      a. Use broken-joint construction in application of two-layer covering.
      b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
         1) Apply by hand in several layers to make up total specified thickness.
         2) Final layer shall have smooth uniform finish before application of covering.
   5. Fittings, Valves, And Accessories:
      a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
      b. 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.

c. Piping Up To 1-1/4 Inch Diameter:
    1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
    2) Alternate Method:
        a) 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.
d. Piping 1-1/2 inches To 2 Inches:
    1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
    2) Apply final coat of fitting mastic over insulating cement.
e. Piping 2-1/2 inch And Larger:
    1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
    2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.

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 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.
    c. At Pipe Hangers:
        1) Provide rigid calcium silicate insulation (100 psi (690 kPA) compressive strength) at least 2 inches beyond shield.
7. 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.

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

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SECTION 22 1116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform excavating and backfilling required by work of this Section.
   2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building as described in Contract Documents.
   3. Copper pipe shall be used in boiler room and tunnels (no exceptions). In all other areas copper or the specified plastic pipe may be used.

B. Related Requirements:
   1. Section 22 0501: 'Common Piping Requirements'.
   2. Section 22 0719: 'Plumbing Piping Insulation'.
   3. Section 31 2316: 'Excavation' for criteria for performance of excavation.
   4. Section 31 2323: 'Fill' for criteria for performance of backfill.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / American Society of Sanitary Engineers:
      a. ANSI/ASSE 1003-2009, 'Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems'.
      b. ANSI/ASSE 1017-2009, ‘Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems'.
      c. ANSI/ASSE 1070-2015, ‘Performance Requirements for Water Temperature Limiting Devices'.
   2. 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’.
   3. ASTM International:
      a. ASTM B88-16, 'Standard Specification for Seamless Copper Water Tube'.
      b. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.
      c. ASTM F876-17, ‘Standard Specification for Crosslinked Polyethylene (PEX) Tubing’.
      d. ASTM F877-18a, ‘Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems’.
      e. ASTM F1807-18a, ‘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’.
      g. ASTM F2389-17a, ‘Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems'.
   4. NSF International Standard:
      a. NSF P171, 'Protocol for Chlorine Resistance of Plastic Piping Materials' (1999).
   5. NSF International Standard / American National Standards Institute:
      a. NSF/ANSI 14-2018, 'Plastic Piping System Components and Related Materials'.
      b. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
      c. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Qualifications:

1. Manufacturer Qualifications:
    a. PP-R pipe and PP-RCT pipe:
        1) Certified by NSF International.
2. Installers Qualifications:
    a. PP-R pipe and PP-RCT pipe:
        1) Certified by Manufacturer.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
    a. Manufacturer's Literature:
        1) PEX pipe and PEX pipe fittings.
        2) PP-R pipe and PP-R pipe fittings.
        3) PP-RCT pipe and PP-RCT pipe fittings.
2. Samples:
    a. PEX pipe fitting.

B. Informational Submittals:
1. Test And Evaluation Reports:
    a. Written report of sterilization test.

1.5 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.

1.6 WARRANTY

A. Manufacturer Warranty:
1. Manufacturer’s Warranty covering property damage caused by defective product including renovation costs or replacement costs.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
    a. Aquatherm, Inc., Lindon, UT www.aquathermpipe.com.
    b. Acorn Controls, City of Industry, CA www.acorneng.com
    c. Cash Acme, Cullman, AL www.cashacme.com
    d. Chicago Faucets, Des Plaines, IL, www.chicagofaucets.com.
    e. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Beamsville, ON www.cla-val.com.
    f. Conbraco Industries Inc, Matthews, NC www.conbraco.com or Conbraco (Honeywell Ltd), Scarborough, ON (416) 293-8111.
    g. Hammond Valve, New Berlin, WI www.hammondvalve.com.
    h. 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.
    i. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
    j. Honeywell Inc, Minneapolis, MN www.honeywell.com.
    k. Leonard Valve Co, Cranston, RI www.leonardvalve.com.
    l. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
    m. Nibco Inc, Elkhart, IN www.nibco.com.
    n. Nupi Americas, Early Branch, SC www.nupiamericas.com.

o. Rehau, Leesburg, VA www.rehau-na.com.
p. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
q. Spence Engineering Co, Walden, NY www.spenceengineering.com.
r. Symmons Industries, Braintree, MA www.symmons.com.
s. Uponor Inc, Apple Valley, MN www.uponor-usa.com.
t. Viega ProPress, Wichita, KS www.viega-na.com.
u. Watts Regulator Co, Andover, MA www.wattsreg.com.
v. Wilkins (Zurn Wilkins), Paso Robles, CA www.zurn.com.
w. 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 minimum under slabs.
b) 2 inches And Smaller: Annealed soft drawn.
c) 2-1/2 inches And Larger: Hard 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 at 73 deg F, 100 psi at 180 deg F, and 80 psi at 200 deg F.
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.
c. Polypropylene-Random (PP-R):
1) Above-Grade:
a) Meet requirements of ASTM F2389 and be certified by NSF International per ASTM F2389, NSF/ANSI 14, and NSF/ANSI 61.
b) Aquatherm: SDR 7.4 Greenpipe faser for domestic hot water and SDR 7.4 or SDR 11 greenpipe for domestic cold water. Aquatherm Lilac SDR 11 purple piping for recycled/reclaimed water systems.
c) Nupi Americas: Clima pipe for domestic Hot water SDR-7.3 or cold water SDR 11 Nupi Niron Monolayer purple pipe for recycled/ reclaimed water Systems.
2) Below-Grade:
a) Meet requirements of ASTM F2389 and be certified by NSF International per ASTM F2389, NSF/ANSI 14, and NSF/ANSI 61.
b) Aquatherm: SDR 7.4 Greenpipe faser for domestic hot water and SDR 7.4 or SDR 11 greenpipe for domestic cold water. Aquatherm Lilac SDR 11 purple piping for recycled/reclaimed water systems.
c) Nupi Americas: Clima pipe for domestic Hot water SDR-7.3 or cold water SDR 11 Nupi Niron Monolayer purple pipe for recycled/ reclaimed water Systems.
3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Aquatherm Greenpipe, Greenpipe faser, and Lilac by Aquatherm.
b) Nupi Americas Clima pipe, and Nupi Niron.
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.

c. For PP-R Pipe:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Greenpipe by Aquatherm.
b) Niron Clima by Nupi Americas.

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. Connections For PP-R Pipe:
a. Above-Grade:
1) Socket-fusion, fusion-outlet, electrofusion, buttwelding, and mechanical transition fittings including threaded adapters, groove adapters, and flanges.
b. Below-Grade:
1) All joints shall be fusion-welded or electro-fusion welded PP-RCT except that flanges may be used when connecting to other piping systems. Mechanical fittings shall not be used below grade.
2) Joints under slabs acceptable only if allowed by local codes.

6. 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 SWP.
1) Operate with flow in either direction, suitable for throttling and tight shut-off.
2) Body: Bronze, 150 psig wsp at 350 deg F and 400 psig wog.
3) Seat: Bubble tight at 100 psig under water.
c. Class One Quality Standard: Nibco T585 or S585.
1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
d. PP-R piping if used:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) PP-R fusion-weld ball valves by Aquatherm.
b) PP-RCT Fusion by Nupi Americas.

7. Mixing Valve For Lavatories:
a. Solid brass construction and CSA B125 certified.
b. Includes integral check valves and inlet screen. Features advanced paraffin-based actuation technology.
c. Flow of 5.7 GPM with maximum 10 psi pressure drop. Perform to minimum flow of 0.5 GPM in accordance with ASSE 1070.
d. Set for 110 deg F Service.
e. Match Construction Drawings for connection sizes.
f. Class One Quality Standard: Powers LFLM495. See Section 01 6200.
g. Acceptable Manufacturers: Acorn, Chicago Faucets, Leonard, Powers, Sloan, Symmons and Watts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Below Grade:
   1. Install piping under slabs without joints where possible.
   2. Insulate water piping buried within building perimeter.
   3. Bury water piping 6 inches minimum below bottom of slab and encase in 2 inches minimum of sand.

B. Locate cold water lines a minimum of 6 inches 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 hydrostatic pressure for four (4) hours and show no leaks.
   2. Disconnect equipment not suitable for 125 psig pressure from piping system during test period.
   3. PP-R Piping:
      a. Test in accordance with Manufacturer's instructions prior to covering.
         1) Provide documentation.

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

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SECTION 22 1119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install miscellaneous potable water piping specialties as described in Contract Documents.

B. Related Requirements:
   1. Section 22 0501: 'Common Plumbing Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. NSF International Standard / American National Standards Institute:
      a. NSF/ANSI 61-2014a, 'Drinking Water System Components - Health Effects'.
      b. NSF/ANSI 372-2011, '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.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. AMTROL, Inc.
      b. Ashcroft, Stratford, CT www.ashcroftinc.com.
      c. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Bearnsville, ON www.cla-val.com
      d. CMB Industries, Inc.; Febco Backflow Preventers
      e. H O Trerice, Oak Park, MI www.hotco.com.
      f. Hammond Valve, New Berlin, WI www.hammondvalve.com
      g. IPS Corporation, Compton, CA www.ipscorp.com.
      h. Josam Co, Michigan City, IN www.josam.com.
      i. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
      j. Leonard Valve Co., Cranston, RI www.leonardvalve.com
      k. Milwaukee Valve Co., New Berlin, WI www.
      l. Mueller Co.; Hersey Meters Div.
      m. PPP Inc.
      n. Prier Products, Inc., Grandview, MD www.prier.com.
      o. Proset Systems Inc., Lawrenceville, GA www.prosetsystems.com.
      p. Sioux Chief Manufacturing Co, Peculiar, MO www.siouxchief.com.
      q. Sloan Valve Co., Frankin Park, IL www.sloanvalve.com
      r. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
      s. Spence Engineering Co., Franklin Park, IL www.sloanvalve.com
      t. Sure Seal, Tacoma, WA www.thesureseal.com.
      u. Symmons Industries, Braintree, MA www.symmons.com

v. Wade (Division of Tyler Pipe), Tyler, TX www.wadedrains.com.
w. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
x. Watts Industries, Inc.; Water Products Div.
y. Watts Regulator Co., Andover, MA www.wattsreg.com
z. Weiss Instruments, Inc., Holtsville, NY www.weissinstruments.com.
aa. Wilkins Operation, Paso Robles, CA www.zurn.com
bb. Woodford Manufacturing, Colorado Springs, CO www.woodfordmfg.com.
cc. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.
dd. Zurn Industries, Inc.; Wilkins Div.
ee. Zurn Pipe; Wade Co.
ff. Zurn Plumbing Products Group; Specification Drainage Operation

B. Materials:
1. Exterior Hydrants:
a. Design Criteria:
1) Provide with integral anti-siphon device. Key-operated.
2) Non-freeze: Provide 12 inches minimum from inside face of outside wall into heated space.
3) Not required to meet NSF International Standards for Lead Free.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Josam: 71050.
2) Jay R. Smith: 5609-QT.
3) Prier: C-634.
4) Wade: W-8600.
5) Watts: HY-725.
6) Woodford: 67.
7) Zurn: Z-1310.
2. Water Hammer Arrestors:
a. Design Criteria:
1) Meet NSF International Standards for Lead Free.
2) Nesting type, air pre-charged bellows with casing.
3) Bellows constructed of stabilized 18-8 stainless steel.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Josam: 75003.
2) Jay R. Smith: 5020.
3) Sioux Chief: 650 Series.
4) Wade: 20.
3. 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 SWP.
1) Operate with flow in either direction, suitable for throttling and light shut-off. Full port, three-piece maintenance design.
2) Body: Bronze, 150 psig wsp at 350 deg F and 400 psig wog.
3) Seat: Bubble tight at 100 psi under water.
c. Class One Quality Standard; Nibco T585 or S585.
1) Equal to Conbraco 'Apollo,' Hammond, Milwaukee, or Watts
4. Mixing Valve for Lavatories:
a. Solid brass construction and CSA B125 certified.
b. Includes integral check valves and inlet screen. Features advanced paraffin-based actuation technology.
c. Flow of 5.7 GPM with maximum 10 psi pressure drop. Perform to minimum flow of 0.5 GPM in accordance with ASSE 1016 and 1070.
d. Set for 110 deg F service.
e. Class One Quality Standard: Powers LM495 with 894-3709 thermometer. See Section 01 6200.
f. Acceptable Manufacturers: Leonard, Powers, Sloan, Symmons and Watts.
5. Recirculation Pump and Circulation Pump Control:
a. Hot water demand control type.

b. WR-16A Wireless Receiver.
c. WM-S-16A Wireless Motion Sensors.
d. Type One Acceptable Products:
    1) AutoHot DCP150-13 and above wireless controls by Enovative Group, Venice, CA www.enovativegroup.com
    2) Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION - None

END OF SECTION

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SECTION 22 3423

GAS DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Upgrade existing gas-fired storage type water heater 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 Standards:
   1. 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 Sustainability Approvals:
   1. Seismic Anchoring System:
      a. Required for Seismic Design Category (SDC) C, D, E, or F or where authority having jurisdiction (AHJ) requires seismic protection use for water heater seismic anchoring systems.
   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.
   3. Anchoring Components:
      a. Seismic and California certified/approved and labeled:
         1) Straps/anchoring systems.
         2) Fasteners.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Anchoring Components:
   1. Seismic and California certified/approved and labeled.
      a. One inch by 18 ga galvanized steel straps.
      b. 3/8” x 3” expansion bolts.

B. Recirculation Pump and Circulation Pump Control:
   1. Hot water demand control type.
   2. WR-16A Wireless Receiver.
   3. WM-S-16A Wireless Motion Sensors.
   4. Type One Acceptable Products:
      a. AutoHot 150 Series with wireless receiver and sensors by Enovative Group.
      b. Equal as approved by Architect before bidding. See Section 01 6200.

C. Thermal Expansion Absorbers:
   1. Bladder type for use with potable water systems.
   2. Type One Acceptable Products:

a. Therm-X-Trol ST-12 by Amtrol Inc, West Warwick, RI www.amtrol.com.
b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor water heaters to wall using two anchoring straps and specified screws.
   1. Anchors shall be installed with one on vertical upper 1/3 and one on lower 1/3 of water heater.

B. Install hot water circulation pump and pump controls per manufacturer's instructions:
   1. Coordinate with Contract Drawings for location of wireless receiver and motion sensors.
   2. Connect wireless receiver to pump control box.
   3. Install wireless motion sensors.

3.2 ADJUSTING

A. Set discharge water temperature at 140 deg F or as indicated on Contract Drawings.

END OF SECTION

SECTION 22 4213

COMMERCIAL WATER CLOSETS AND URINALS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Re-pipe existing 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'.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:
1. Water Closet Accessories:
a. Supply Pipe And Stop:
1) Provide chrome plated quarter-turn brass ball valve, 12 inch 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.
b. Flush Valve:
1) Standard:
a) Water usage of 1.6 gallons per flush.
b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) American Standard 6065.161.
(2) Delany: PL-1451-1.
(3) Delta: 81T201BTA (adjustable gpf) or 81T201BTA-6 fixed).
(4) Moen: 8310.
(5) Sloan: 111-SFSM.
(6) Zurn: ZR6000AV-WS1.
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.
2. Urinal Accessories:
a. Flush Valve:
1) 1 gallon per flush.
2) Proximity sensor type with battery.
3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) American Standard 6063.101.
b) Delany: PL 1451-1.
c) Delta: 81T231BTA.
d) Moen: 8312.
e) Sloan: 186-1.0.
f) Zurn: ZR6003AV with maintenance override button.
b. 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. Adjust flush valves for proper flow.

B. Provide each individual fixture supply with accessible chrome-plated stop valve with hand wheel.

C. Urinals: Install with accessible stop or control valve in each branch supply line.

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. Re-pipe existing 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 A112.6.7-2010 (R2015), ‘Sanitary Floor Sinks’.
      c. ASME A112.19.1-2013/CSA B45.2-13, 'Enameled cast iron and enameled steel plumbing fixtures’.
      d. 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.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Components:
   a. Lavatory Fittings:
      1) 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 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.
      2) Safety Covers for Handicap 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. Stainless Steel Sink Fittings:
1) 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 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.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.

B. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.

C. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.

D. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.

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. Re-pipe existing 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 A117.1-2017, 'Standard for Accessible and Usable Buildings and Facilities'.
   2. NSF International Standard / American National Standards Institute:
      a. Water Cooler:
         1) NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
         2) NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.
   3. Underwriters Laboratories (UL):
      a. UL 399: 'Drinking-Water Coolers’.

PART 2 - PRODUCTS - NONE

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fixtures with accessible stop or control valve.

B. Mounting:
   1. General:
      a. Install 3/8-inch IPS union connection and Chicago No. 441 stop to building supply line.

3.2 CLEANING

A. Polish chrome finish at completion of Project.

END OF SECTION

B L A N K P A G E