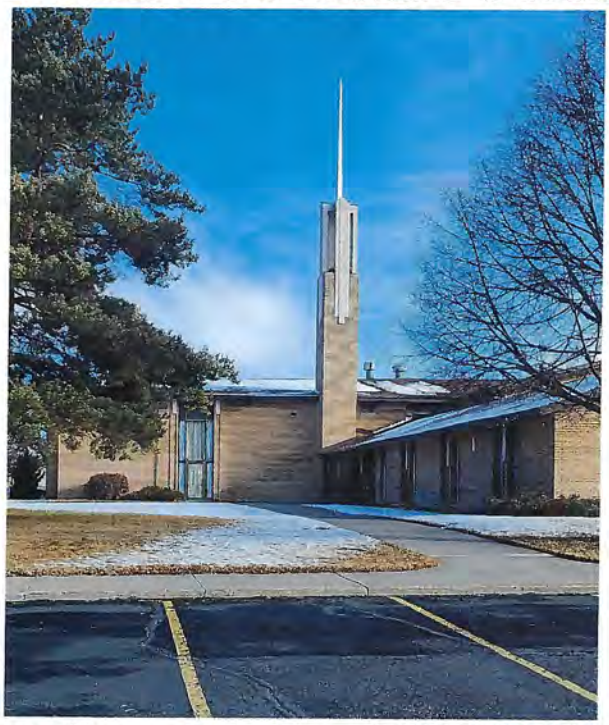
PROJECT MANUAL

BLACKFOOT 1, 7, 13, ROOF, HVAC

BLACKFOOT IDAHO STAKE



Property/Project Number: 513259223030101

1650 Highland Drive
Blackfoot, Idaho 83221

Architect: **JAMES K. LYSTRUP**
2453 Malaga Ave
Santa Clara, UT 84765
Phone: (208) 406-3153

Mechanical Engineer: **ENGINEERED SYSTEMS**
1355 E. Center Street
Pocatello, Idaho 83201

March 2025

BIDDING REQUIREMENTS

FIXED SUM PROJECT (U.S.)

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INVITATION TO BID (U.S.)

1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:

Coffin Construction
DWA Construction
K&T Construction
Headwaters Construction
Jones Construction
J&S Construction

2. PROJECT:

Blackfoot 1, 7, 13 Roof HVAC
Blackfoot Idaho Stake

3. LOCATION:

1650 Highland Drive
Blackfoot, Idaho 83221

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
(Allan Christean, PM)

5. CONSULTANT:

James K. Lystrup, Architect
2453 Malaga Ave.
Santa Clara, UT 84765

6. DESCRIPTION OF PROJECT:

A. Remove existing roofing materials, install new. Replace existing HVAC with new.

B. Products or systems may be provided through relationships the Owner has negotiated with suppliers as indicated 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 90 calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at (time and date at place) to be announced. Bids will be publicly opened at (time and date at place) to be announced.

10. BIDDING DOCUMENTS:

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

1)

2)

3)

4)

B. Bidding Documents may be obtained from the Architect.

C. Bidding Documents may be obtained from Owner's electronic bidding tool.

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

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

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

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DEFINITIONS:

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

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

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

2. BIDDER'S REPRESENTATIONS:

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

3. BIDDING DOCUMENTS:

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

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

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

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

D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than 2 business days prior to bid opening.

4. BIDDING PROCEDURES:

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

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

C. Submission of Bids
1) Follow the instructions in the Owner's bidding tool when submitting your bid.
2) It is bidder's sole responsibility to see that its bid is received at specified time.
3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

D. Modification or Withdrawal of Bid
1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
2) Prior to bid opening, bidders may withdraw bid from Owner's bidding tool.

5. CONSIDERATION OF BIDS:

A. Opening of Bids - See Invitation to Bid.

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

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

together with amount of bid, will be elements considered in award of contract.

6. POST-BID INFORMATION:

A. The conditionally accepted bidder submitting a bid involving subcontractors will submit its list of proposed subcontractors within 24 hours after bid opening.

7. PERFORMANCE BOND AND PAYMENT BOND:

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

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

8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Agreement Between Owner and Contractor for a Fixed Sum (U.S.)", "General Conditions Fixed Sum (U.S.)" and "Supplementary Conditions Fixed Sum (U.S.)".

9. MISCELLANEOUS:

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

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

C. Examination Schedule for Existing Building and Site
1)

D. Exemption from local taxes - See Supplementary Conditions

END OF DOCUMENT

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INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. Geotechnical Report -

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

a) A geotechnical report has been prepared by N/A, referred to as the Geotechnical Engineer.

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

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

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

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

2. ASBESTOS-CONTAINING MATERIAL (ACM)

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

1) N/A

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

END OF DOCUMENT

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SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST

Project Name: _____ Date: _____

Stake: _____ Project No: _____

General Contractor: _____

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

VMR SUBCONTRACTORS

Roofing _____

Doors, Frames & Hardware _____

Storefronts _____

Wood Flooring _____

Other _____

Other _____

SUBCONTRACTORS AND SUPPLIERS

Grading / Site work _____

Site Utilities _____

Demolition _____

Paving _____

Termite Control _____

Site Concrete _____

Fencing _____

Irrigation System _____

Landscaping _____

Building Concrete _____

Masonry _____

Structural Steel _____

Framing _____

Trusses _____

Insulation _____

EIFS _____

Soffit / Fascia _____

Steeple _____

Millwork _____

Drywall _____

Ceramic Tile _____

Acoustical Tile _____

Painting _____

Wall Coverings _____

Elevators / Lifts _____

Draperies _____

Fire Sprinklers _____

Plumbing _____

HVAC _____

Electrical _____

Controls _____

Sound / Satellite _____

EQUAL PRODUCT APPROVAL REQUEST FORM (U.S.)

Project Name: _____ Request Number: _____

TO: _____

FROM: _____

BID DATE: _____

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

PROPOSED EQUAL PRODUCT:

Specification Section: _____

Specified Products: _____

Proposed Product: _____

The Undersigned certifies:

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

ATTACHMENTS:

Include the following attachments -

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

SIGNED: _____

Printed Name _____

Company _____

Address _____

City, State, Zip Code _____

Telephone _____ Fax _____

REVIEW COMMENTS:

_____ Accepted. See Addenda Number _____.

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

_____ Proposed equal product not acceptable. Use specified products.

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

ADDITIONAL COMMENTS:

BY: _____ **DATE:** _____

CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS,
a Utah corporation sole

Building Name: _____

Building Plan Type: _____

Building Address: _____

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

Project Number: _____

Completion Date: _____

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

_____ _____
Project Consultant and Principal in Charge (signature) Date

_____
Company Name

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

_____ _____
General Contractor (signature) Date

_____
Company Name

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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 300.00 dollars ($100.00) 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

Alabama

N/A

Alaska

N/A

Arizona

Replace section 5.b. of the Agreement with the following:

b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for Work completed within seven (7) days after:
   1. Contractor submits to Owner Contractor's payment request for Work to date;
   2. Contractor provides to Owner 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;
   3. Contractor has obtained 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; and
   4. Owner has certified and approved all or part of the payment request and notified Contractor in writing (which Owner must do within 14 days of Contractor's submission of the payment request to Owner).

   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.

Arkansas

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.

N/A

California

N/A

Colorado

COLORADO STATE SALES TAX:

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

1. Contractor will make an application to State Department of Revenue for certificate of exemption to permit purchase of building materials for construction of this Project without payment of Sales Tax. Applications and certificates will be on forms provided by the Department of Revenue.

2. Prior to start of construction, Contractor will furnish to the Owner copies of the applications submitted and certificates obtained. Upon receipt of the certificate Contractor shall make a copy for each subcontractor involved in the Project and complete it by filling in the subcontractor's name and address and signing it. The original certificate and copies of all certificates that the Contractor issues to subcontractors should be kept at the Contractor's place of business for a minimum of three years.

3. The Owner's sales tax exemption number for the State of Colorado is 98-01587.

Connecticut

CONNECTICUT STATE SALES TAX:

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

1. Sales of materials and supplies that will be physically and permanently incorporated into the construction project should be exempt from Connecticut state sales tax. The Owner's sales tax exemption number for the State of Connecticut is E-9613.

Delaware

N/A

District of Columbia

WASHINGTON D.C. SALES TAX:

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

1. Materials that will be physically incorporated into and made a part of the Owner's real property may be purchased by the Contractor free of Washington D.C. sales tax.

2. The Owner's tax exempt number is 8661-0185848-001.

3. Contractor is responsible for submitting the Tax Exempt Purchase Certificate Form for real property projects on behalf of the Owner.

Florida

NOTICE OF COMMENCEMENT

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

Before commencing the Project, Contractor shall record a notice of commencement in the clerk's

office and post a certified copy thereof. The notice of commencement shall substantially comply with the form in Florida Statutes 713.13 and contain the following information:

1. A description sufficient for identification of the real property to be improved. The description should include the legal description of the property and also should include the street address and tax folio number of the property if available or, if there is no street address available, such additional information as will describe the physical location of the real property to be improved.
2. A general description of the improvement.
3. The name and address of the owner, the owner's interest in the site of the improvement, and the name and address of the fee simple titleholder, if other than such owner. A lessee who contracts for the improvements is an owner as defined under Florida Statutes s. 713.01(23) and must be listed as the owner together with a statement that the ownership interest is a leasehold interest.
4. The name and address of the contractor.
5. The name and address of the surety on the payment bond under Florida Statutes s. 713.23, if any, and the amount of such bond.
6. The name and address of any person making a loan for the construction of the improvements.
7. The name and address within the state of a person other than himself or herself who may be designated by the owner as the person upon whom notices or other documents may be served under this part; and service upon the person so designated constitutes service upon the owner.

Georgia

N/A

Hawaii

N/A

Idaho

N/A

Illinois

ILLINOIS STATE CONTRACTOR TO PROVIDE NOTICE OF SUBCONTRACTORS:

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

Contractor shall provide to Owner a statement of names and addresses of all those furnishing for this Project labor, services, material, fixtures, apparatus or machinery, and form or forms work, as well as the amounts due or to become due to such persons / entities. Such notice shall be in writing and under oath or verified by affidavit. Notwithstanding any provision to the contrary, Owner is not required to make payments to Contractor until Contractor provides Owner sufficient evidence of Contractor's compliance with this notice requirement.

ILLINOIS STATE SALES TAX:

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

1. Sales of materials to construction contractors for incorporation into the Owner's real estate may be exempt from Illinois state sales tax. (Sales of tools, fuel, lumber for forms, and other end use or consumption items to contractors who do not incorporate these items into real estate are subject to Illinois state sales tax.)

2. Contractor will obtain and provide subcontractors and suppliers with a certificate that
   - States the construction contractor's purchases are for conversion into real estate under a contract with the Owner;
   - Identifies the Owner by name and address; and

- States on what date the contract was entered into.

The Contractor will also provide subcontractors and suppliers with the sales tax exemption number for Owner. The Owner's sales tax exemption number for the State of Illinois is E9986-4045-06.

Indiana

INDIANA STATE SALES TAX:

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

1. Purchase of materials and supplies might be exempt from Indiana state sales tax. In the event that the Project qualifies for a sales and use tax exemption, the Owner's sales tax exemption number for the State of Indiana is 7343965.

Iowa

N/A

Kansas

KANSAS STATE SALES TAX:

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

1. Upon obtaining a certificate of tax exemption for the project, an exemption from Kansas state sales tax should be allowed for tangible personal property and services purchased by Contractor for the project. Purchases of construction machinery, equipment or tools for the project are not exempt but rather are subject to state sales tax.

2. Prior to beginning work on the project, Contractor will assist the Owner in making a timely application to the State for a certificate of tax exemption for the project. After the certificate of tax exemption is obtained from the State, Contractor will furnish the number of the certificate to all suppliers from whom it makes purchases; and all such suppliers shall execute invoices covering the items purchased bearing the number of such certificate. In addition, upon completion of the project, Contractor will timely furnish to Owner a sworn statement (on the form provided by the Kansas Director of Taxation) that all purchases made under such exemption certificate were entitled to the tax exemption. All invoices for such tax exempt purchases shall be held by Contactor for a period of five years.

Kentucky

N/A

Louisiana

N/A

Maine

MAINE STATE SALES TAX:

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

1. The General Contractor should be exempt from Maine state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 20460.

Maryland

MARYLAND STATE SALES TAX:

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

1. The General Contractor should be exempt from Maryland state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 29020063.

Massachusetts

MASSACHUSETTS STATE SALES TAX:

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

1. The General Contractor and its subcontractors should be exempt from Massachusetts state sales tax on purchases for this project. Contractors will obtain and complete state form ST-5C and submit it to Owner for signature and return. Contractor will then use the completed Purchase Certificate in making purchases for this Project.

2. The Owner's tax exempt number is E870-234-341.

Michigan

NOTICE OF COMMENCEMENT

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

Before commencing the Project, Contractor shall record a Notice of Commencement in the office of the register of deeds for each county in which the real property to be improved is located and post a copy thereof in a conspicuous place on the property. The notice of commencement shall substantially comply with the form in Michigan Compiled Laws 570.1108 and contain the following information:

1. The legal description of the real property on which the improvement is to be made conforming with Michigan Compiled Laws sections 560.212 and 560.255.
2. The name, address, and capacity of the signor for the Owner.
3. The name and address of Owner's designee signing on behalf of Owner.
4. The name and address of the general contractor, if any.
5. The following statement:

   To lien claimants and subsequent purchasers:

   Take notice that work is about to commence on an improvement to the real property described in this instrument. A person having a construction lien may preserve the lien by providing a notice of furnishing to the above-named designee and the general contractor, if any, and by timely recording a claim of lien, in accordance with law.

   A person having a construction lien arising by virtue of work performed on this improvement should refer to the name of the Owner or lessee and the legal description appearing in this Notice. A person subsequently acquiring an interest in the land described is not required to be named in a claim of lien.

   A copy of this Notice with an attached form for notice of furnishing may be obtained upon making a written request by certified mail to the above-named Owner or lessee; the designee; or the person with whom you have contracted.
6. The name and address of the person preparing the Notice.
7. An affidavit of the Owner or the agent of the Owner which verifies the Notice.

Contractor must provide to Owner a copy of the Notice as well as prepare and provide to Owner the Affidavit verifying the Notice for Owner's signature no later than seven (7) days prior to the time Contractor needs to receive the Affidavit back from Owner in order for Contractor to timely finalize and record the Notice of Commencement with its attachments.

In addition to recording and posting the Notice of Commencement, Contractor shall provide the Notice of Commencement and a blank notice of furnishing (described in Michigan Compiled Laws 570.1108), from

time to time, to the property Owner as well as all subcontractors, laborers, or suppliers who request the Notice of Commencement.

CONTRACTOR TO PROVIDE SWORN STATEMENTS

Notwithstanding all other terms and conditions of the Contract Documents, Owner has the right (but no obligation) to require Contractor to submit to Owner a sworn statement that complies with Michigan Compiled Laws 570.1110 prior to the time payment is due or otherwise from time to time.

Minnesota

N/A

Mississippi

N/A

Missouri

MISSOURI STATE SALES TAX:

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

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax in accordance with Section 144.062 RSMO as modified by the 1994 Missouri General Assembly.

2. The Owner will furnish a 'Missouri Project Exemption Certificate' and a MO Tax Exemption Letter' to the Contractor.

3. The Owner's tax exempt number is 12473863.

Montana

N/A

Nebraska

NEBRASKA STATE SALES TAX:

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

1. Pursuant to applicable laws, Contractor will make application to The Nebraska Department of Revenue to act as prime contractor for approval to use Owner's tax exempt number to permit the purchase of building materials for construction of this Project without payment of sales and use tax. Contractor may delegate its authority to its subcontractors as allowed by law to act as the purchasing agent for tax exemption purposes. Subcontractors shall follow the same application and compliance requirements as the Contractor. Applications will be on forms provided by The Nebraska Department of Revenue.

2. Prior to start of construction, Contractor will furnish copies of the submitted application forms to Owner.

Nevada

NEVADA 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 108.228 Nevada Revised Statutes, Contractor shall, on behalf of the Owner, file with the office of the county recorder of the county where the property is located, and copy to Owner, a notice of completion which shall include, without limitation, the following:

1. The date of completion of the work of improvement;
2. The owner's name, the address of the owner, and the nature of the title of any person signing the notice;
3. A description of the property sufficient for identification;
4. The name of the prime contractor or contractors, if any.

Contractor shall verify the notice of completion on the Owner's behalf.

B. Upon recording the notice, Contractor shall within ten (10) days deliver a copy of the notice by certified mail to each prime contractor and each potential lien claimant who, before the notice was recorded, either submitted a request to the owner to receive the notice or delivered a preliminary notice of right to lien.

C. 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.

N/A

New Hampshire

N/A

New Jersey

NEW JERSEY STATE SALES TAX:

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

1. The General Contractor should be exempt from New Jersey state sales tax on its purchases for this project.

2. The Owner's tax exempt number is EO-237-300-405.

New Mexico

NEW MEXICO STATE PROGRESS PAYMENT AND FINAL PAYMENT:

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

5. Payment.

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. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within twenty-one (21) days after the following:
   (1) Owner receives Contractor's undisputed payment request for work to date;
   (2) Owner receives 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) Contractor has obtained 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.

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. Owner will make full and final payment within twenty-one (21) days of the completion of all of the following requirements:
    1. Contractor has submitted to Owner Contractor's final payment request;
    2. Architect, if any, has declared to Owner in writing that the Work is complete; and
    3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request; and
    4. Contractor has provided to Owner all manufacturers' and other warranties and guaranties, properly signed and endorsed to Owner. (Delivery of such guaranties and warranties will not relieve Contractor of any obligation assumed under any other provision of the Contract Documents.)

NEW MEXICO STATE PAYMENT OF SUBCONTRACTORS AND MATERIALMEN:

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

11. **Payment of Subcontractors and Materialmen.** Contractor will promptly pay for all labor, materials, and equipment used to perform the Work. Contractor agrees to make prompt payment to its subcontractors within seven (7) days of Contractor's receipt of payment from Owner for that portion of the funds received which represents the subcontractor's portion of the Work completed to Contractor's satisfaction for which payment was made by Owner. Failure of Contractor to make payment within that seven (7) day period will subject Contractor to pay interest to its subcontractors on the undisputed amount at one and one-half percent per month or fraction of a month until payment is issued. Contractor agrees to require of its subcontractors that they make prompt payment to their subcontractors within seven (7) days of their receipt of payment from the Contractor for that portion of the funds received which represents their subcontractor's portion of the Work completed and to be subject to interest at one and one-half percent per month on undisputed amounts not paid to their subcontractors within that seven (7) day period.

New York

NEW YORK STATE SALES TAX:

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

1. Exemption from tax is allowed for materials sold to the Contractor for this project. For equipment rentals as well as any materials not used in the building, the Contractor is subject to New York sales tax.

2. The Owner's tax exempt number is 105318.

North Carolina

NORTH CAROLINA STATE SALES TAX:

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

1. At end of each calendar quarter, Contractor will provide Owner with the following information from invoices for materials and sub-contract work where North Carolina sales tax has been paid:
    a. Date of invoice
    b. Amount of tax
    c. Name and address of person or company.

LIEN AGENT

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

Where the Contract Sum exceeds Thirty Thousand Dollars ($30,000), Contractor on behalf of Owner shall, simultaneous with the execution of the Agreement and at Contractor's sole expense, obtain and

maintain throughout the duration of the Project a lien agent for the Project in satisfaction of North Carolina statutes G.S. § 44A-11.1 & § 44A-11.2. In addition, Contractor shall satisfy all notice requirements under applicable law regarding the lien agent, including, without limitation, providing written information of the lien agent in the building permit and/or on a sign posted and maintained on the Project Site.

North Dakota

N/A

Ohio

OHIO STATE SALES TAX:

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

1. Contractor's purchases of materials to be used for this project should be exempt from Ohio state sales tax. Contractor will issue exemption certificates to suppliers.

OHIO STATE NOTICE OF COMMENCEMENT:

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

1. In accordance with State of Ohio lien laws, Owner may file Notice of Commencement with the County Recorder of the county in which the Project is located and provide a copy of that notice to Contractor. Contractor will be responsible for distributing notice to subcontractors and suppliers.

Oklahoma

OKLAHOMA STATE SALES TAX

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

1. The General Contractor and its subcontractors should be exempt from Oklahoma state sales tax on purchases for this project.
2. The Owner will provide a copy of its exemption documentation.
3. In compliance with Oklahoma Rule 710:65-7-13, Contractor will, on the face of each invoice or sales receipt, set out the name of the Owner, that the purchases are being made on behalf of the Owner, and that the purchases are necessary for the completion of the Agreement.

Oregon

N/A

Pennsylvania

PENNSYLVANIA STATE SALES TAX:

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

1. Sales of certain materials to construction contractors for incorporation into the Owner's real estate may be exempt from Pennsylvania state sales tax. Pennsylvania law 72 P.S. § 7201 allows construction contractors to claim the Owner's sales tax exemption for "Building Machinery and Equipment" that is transferred pursuant to the construction contract to the Owner. "Building Machinery and Equipment" is "[g]eneration equipment, storage equipment, conditioning equipment, distribution equipment and termination equipment" limited to the following:
   i. air conditioning limited to heating, cooling, purification, humidification, dehumidification and ventilation;
   ii. electrical;

iii. plumbing;
iv. communications limited to voice, video, data, sound, master clock and noise abatement;
v. alarms limited to fire, security and detection;
vi. control system limited to energy management, traffic and parking lot and building access;
vii. medical system limited to diagnosis and treatment equipment, medical gas, nurse call and doctor paging;
viii. laboratory system;
ix. cathodic protection system; or
x. furniture, cabinetry and kitchen equipment.

The definition also explicitly includes: boilers, chillers, air cleaners, humidifiers, fans, switchgear, pumps, telephones, speakers, horns, motion detectors, dampers, actuators, grills, registers, traffic signals, sensors, card access devices, guardrails, medial devices, floor troughs and grates and laundry equipment, together with integral coverings and enclosures, whether or not the item constitutes a fixture or is otherwise affixed to the real estate whether or not damage would be done to the item or its surroundings upon removal or whether or not the item is physically located within a real estate structure.

However, the term "building machinery and equipment" shall not include guardrail posts, pipes, fittings, pipe supports and hangers, valves, underground tanks, wire, conduit, receptacle and junction boxes, insulation, ductwork and coverings thereof.

2. Contractor will obtain and provide subcontractors with Pennsylvania Exemption Certificates—Pennsylvania Form Rev-1220 AS—to be filled out and used when purchasing tax-exempt "Building Machinery and Equipment" for the project. For purposes of filling out Form Rev-1220 AS, the Owner's tax exempt number is 75-259-773.

3. If Contractor or any subcontractor fails to obtain a sales-tax exemption when purchasing "Building Machinery and Equipment," the Contractor or subcontractor shall be responsible for seeking its own refund of sales tax expending by filing a Refund Petition with the Pennsylvania Department of Revenue Board of Appeals.

Rhode Island

RHODE ISLAND STATE SALES TAX:

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

1. Exemption from Rhode Island state sales tax should be allowed for materials purchased by Contractor for this project. Equipment rentals as well as materials not used in the building are subject to state sales tax.

2. The Owner's tax exempt number is 11034.

South Carolina

N/A

South Dakota

N/A

Tennessee

N/A

Texas

TEXAS STATE SALES TAX:

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

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax under Texas Tax Code §151.310. The general Contractor, when purchasing materials and equipment for this Project, should advise the vendors that Owner is an exempt organization and that no sales tax will be paid.

Utah

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. Payment

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.

Vermont

VERMONT STATE SALES TAX:

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

1. Purchases of building materials and supplies should be exempt from Vermont state sales tax if those materials and supplies are consumed in the construction of this Project.

2. The Owner's tax exempt number is 450-870234341F-01.

Virginia
N/A

Washington

WASHINGTON STATE CONTRACTOR DISCLOSURE NOTICE:

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

1. For Projects in state of Washington, the Contractor will provide a 'job site' disclosure notice in accordance with Statute 60.04.230. Contractor will post this notice at the job site. This notice will detail the following:
   a. Legal description and street address of the construction site.
   b. Property Owner's name address, and phone number as shown in the Contract Documents.
   c. Contractor's registration number and identification.
   d. Contractor's business name, address, and telephone number.

West Virginia
N/A

Wisconsin
N/A

Wyoming
N/A

END OF DOCUMENT

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

TABLE OF CONTENTS

SECTION 1 - GENERAL PROVISIONS

1.1 DEFINITIONS

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

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

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

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

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

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

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

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

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

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

K. Day: calendar day unless otherwise specifically defined.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

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

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

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

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

1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

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

1.4 PUBLIC STATEMENTS REGARDING PROJECT

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

1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the

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

1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP

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

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

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

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

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

1.7 CONFIDENTIALITY / PROPERTY RIGHTS

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

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

1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS

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

SECTION 2 - OWNER

2.1 OWNER'S DESIGNATED REPRESENTATIVE

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

2.2 INFORMATION AND SERVICES REQUIRED OF OWNER

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

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

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

2.3 OWNER'S RIGHT TO INSPECT THE WORK

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

2.4 OWNER'S RIGHT TO STOP THE WORK

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

SECTION 3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

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

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

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

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

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

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

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

3.2 SUPERVISION OF CONSTRUCTION PROCEDURES

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

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

C. Contractor will be responsible for:

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

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

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

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

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

3.3 LABOR AND MATERIALS

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

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

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

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

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

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

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

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

3.4 COMPLIANCE WITH LAWS

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

3.5 TAXES

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

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

3.6 PERMITS AND FEES

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

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

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

3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE

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

3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

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

3.9 DOCUMENTS AND SUBMITTALS AT THE SITE

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

3.10 SUBMITTALS

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

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

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

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

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

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

3.11 CUTTING AND PATCHING

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

3.12 ACCESS TO WORK

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

3.13 ROYALTIES AND PATENTS

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

3.14 INDEMNIFICATION

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

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

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

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

3.15 PROJECT MEETINGS

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

SECTION 4 - ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

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

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

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

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

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

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

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

F. Architect will review Contractor's Submittals and will accept or take other appropriate action regarding the Submittals. Architect's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor. Architect's review of Submittals will not relieve Contractor of its obligations under the

Contract Documents. Architect's review of Submittals will not constitute acceptance of safety precautions or construction means, methods, techniques, sequences or procedures. Architect's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.

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

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

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

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

SECTION 5 - SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK

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

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

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

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

5.2 SUBCONTRACTUAL RELATIONS

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

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

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

SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

6.2 MUTUAL RESPONSIBILITY

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

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

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

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

6.3 OWNER'S RIGHT TO CLEAN UP

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

SECTION 7 - CHANGES IN THE WORK

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

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

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

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

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

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

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

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

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

7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE

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

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

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

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

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

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

7.3 EXTENSIONS OF TIME

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

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

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

7.4 DOCUMENTATION OF CHANGES IN THE WORK

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

7.5 CHANGE ORDERS

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

7.6 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

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

7.7 FIELD CHANGES

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

7.8 WAIVER OF CLAIMS

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

SECTION 8 - TIME

8.1 TIME IS OF THE ESSENCE

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

8.2 COMMENCEMENT OF THE WORK

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

8.3 DELAY IN COMPLETION OF THE WORK

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

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

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

SECTION 9 - PAYMENTS AND COMPLETION

9.1 SCHEDULE OF VALUES

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

9.2 PAYMENT REQUESTS

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

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

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

9.3 PAYMENT REQUEST CERTIFICATION

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

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

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

9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT

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

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

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

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

9.5 PROGRESS PAYMENTS

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

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

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

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

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

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

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

9.6 FINAL PAYMENT

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

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

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

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

SECTION 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

10.3 EMERGENCIES

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

10.4 HAZARDOUS MATERIALS

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

SECTION 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

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

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

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

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

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

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

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

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

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

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

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

SECTION 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

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

12.2 CORRECTION OF WORK

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

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

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

12.3 ACCEPTANCE OF NONCONFORMING WORK

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

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

SECTION 13 - RESOLUTION OF DISPUTES

13.1 SUBMITTAL OF DISPUTE

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

13.2 CONTRACTOR TO PROCEED WITH DILIGENCE

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

SECTION 14 - TERMINATION

14.1 TERMINATION BY CONTRACTOR

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

14.2 TERMINATION BY OWNER FOR CAUSE

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

14.3 TERMINATION BY OWNER FOR CONVENIENCE

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

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

SECTION 15 - MISCELLANEOUS PROVISIONS

15.1 GOVERNING LAW

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

15.2 NO WAIVER

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

15.3 RULE OF CONSTRUCTION

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

15.4 ENFORCEMENT

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

15.5 TESTS AND INSPECTIONS

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

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

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

END OF DOCUMENT

ITEM 1 - GENERAL

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

ITEM 2 - LIQUIDATED DAMAGE AMOUNTS:

1. The amount of liquidated damages to the benefit of the Contractor for delays under General Conditions Section 7.3, Paragraph B is $300.00 per day.
2. The amount of liquidated damages to be paid to the Owner for delays in Substantial Completion under General Conditions Section 8.3, Paragraph A is $100.00 per day.
3. The amount of liquidated damages to be paid to the Owner for delays in completing work itemized on the Substantial Completion Certificate under General Conditions Section 8.3, Paragraph B is $100.00 per day.

ITEM 3 - PERMITS

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

   B. The contractor shall secure all local permits prior to performing work on this project.

ITEM 4 - MISCELLANEOUS CHANGES IN GENERAL CONDITIONS

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

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

11.1 CONTRACTOR'S LIABILITY INSURANCE

A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:

   1. Workers Compensation Insurance.
   2. Employers Liability Insurance with minimum limits of the greater of: $500,000 E.L. each accident, $500,000 E. L. disease-each employee, $500,000 E.L. disease-policy limit; or as required by the law of the state in which the Project is located.
   3. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
      a. Limits of the greater of: Contractor's actual coverage amounts or the following:
         1) $2,000,000 General Aggregate;
         2) $2,000,000 Products - Comp/Ops Aggregate:

3) $1,000,000 Personal and Advertising Injury:

4) $1,000,000 Each Occurrence;

5) $50,000 Damage to Rented Premises.

b. Endorsements attached to the General Liability policy including the following or their equivalent:

1) ISO Form CG 25 03 (05/09), Designated Construction Project(s) General Aggregate Limit, describing the project and specifying that limits apply to each project of the contractor.

2) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization, naming Owner and Architect as additional insureds.

4. Automobile Liability Insurance, with:

a. Combined Single Limit each accident in the amount of $1,000,000 or Contractor's actual coverage, whichever is greater; and

b. Coverage applying to "Any Auto" or equivalent to all owned autos, hired autos, and non-owned autos.

5. Builder's Risk Insurance Policy – ISO Form CP 00 20 (10/12), Builders Risk Coverage (or equivalent form) and ISO Form CP 10 30 (10/12) Causes of Loss – Special Form, and ISO Form CP 11 20 (06/07) Builders Risk – Collapse During Construction (or equivalent form) with Limits of Insurance in the amount of the Contract Sum.

a. Policy will cover materials stored at temporary storage locations and materials in transit.

b. Include Owner and Subcontractors as additional insureds.

c. Policy will be subject to a deductible of not less than $5,000 per occurrence which will be the responsibility of Contractor and will not be included in the Cost of the Work or be a reimbursable expense.

B. Contractor will provide evidence of such insurance to Owner as follows:

1. Deliver to Owner a Certificate of Insurance on ACORD 25 (2010/05) or equivalent:

a. Listing Owner as the Certificate Holder and Owner and Architect as Additional Insureds on general liability and any excess liability policies;

b. Attaching the endorsements set forth above for additional insured on general liability (CG 20 10 07/04) and Designated Construction Project Aggregate Limit (CG 25 03 05/09).

c. Identifying the Project.

d. Listing the insurance companies providing coverage. All companies must be rated in A.M. Best Company's Key Rating Guide – Property-Casualty, current edition, at a rating B+ Class VII or better. Companies that are not rated are not acceptable.

e. Bearing the name, address, and telephone number of the producer and signed by an authorized representative of the producer. The signature may be original, stamped, or electronic. A faxed or digital copy is also acceptable.

2. Deliver to Owner a Certificate of Insurance on ACORD 27, Evidence of Property Insurance, for the Builders Risk Insurance Policy attaching the endorsement giving evidence that the Owner and all Subcontractors are listed as additional insureds on the Builders Risk Policy.

C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:

1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs;
2. Builders' Risk Insurance through Substantial Completion; and
3. All other insurance through final payment.

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

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

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

ITEM 5 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Alabama

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN ALABAMA:

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

F. In addition and notwithstanding the forgoing, Owner may also withhold and retain 10% of payments made to Contractor until the work is 50% complete. Thereafter, Owner may continue to hold such retained amounts until completion but no additional retainage based solely on a percentage of the payments being made will be withheld from future payments.

PAYMENT OF RETAINED FUNDS IN ALABAMA:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within sixty (60) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

Alaska

N/A

PAYMENTS AND COMPLETION

Replace subsections 9.3.A of the General Conditions with the following:

A. Architect will, within fourteen (14) Days after receipt of Contractor's payment request, either forward to Owner the payment request certified for such amount as Architect determines is properly due or, if Architect certifies less than the full amount of the payment request, notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.

Replace subsections 9.4.A of the General Conditions with the following:

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

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

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

A. Owner will pay Contractor progress payments within the parameters of Sections 9.2 through 9.4 within seven (7) Days after Owner receives the certified payment request from Architect.

Replace subsections 9.5.F and 9.5.G of the General Conditions with the following:

F. Owner may withhold up to 150% of the direct costs and expenses the Owner reasonably expects to incur to protect the Owner from loss for which the Contractor is responsible and that results from the Contractor's failure to complete portions of the Work at the time of substantial completion or for any reasons set forth in writing.

G. Owner may also withhold 10% retention from each payment request.

H. After Contractor achieves Substantial Completion of the Project, it will submit to Owner a payment request for retained funds and deliver to Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety. Architect will, within fourteen (14) days of Contractor's request for release of retention, forward to Owner the release-of-retention request certified for such amount as Architect determines is properly due. If Architect certifies less than the full amount of the request-for-retention request, Architect will notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.

I. Owner will pay any unpaid retention amounts, less any amounts withheld pursuant to Section 9.4, within seven (7) days after Owner receives the certified release-of-retention request from Architect.

Replace the entirety of subsection 9.6 of the General Conditions with the following:

A. Upon completion of the Work including all of the remaining items of Work identified in the Certificate of Substantial Completion, Contractor will:

1. Give written notice of completion of the Work to Architect;
2. Provide to Architect conditional or unconditional releases or waivers of lien signed by Contractor and all Subcontractors performing work and/or providing labor, materials or equipment for the Project; and
3. Provide to Owner all manufacturer's and other warranties and guarantees required by the Contract Documents, properly signed and endorsed to Owner.

B. After Contractor submits the above-listed documents, Contractor will provide Architect with Contractor's final payment request. Upon receipt of such payment request, Architect will promptly inspect the Work. If the Architect finds that the Work (including all remaining items of Work identified in the Certificate of Substantial Completion) has been completed in accordance with the Contract Documents, Architect will certify the final payment request within fourteen (14) days after receiving a final payment request from Contractor, either forward to Owner the final payment request certified for such amount as Architect determines is properly due or, if Architect certifies less than the full amount of the payment request, notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.

C. Owner will make full and final payment of the Contract Sum within seven (7) Days after completion of all of the following requirements;

1. Architect has declared to Owner in writing that the Work is complete;
2. Architect has received from Contractor conditional or unconditional releases or waivers of lien signed by all Subcontractors performing work and/or providing labor, materials or equipment for the Project;
3. Contractor has submitted Contractor's final payment request;
4. Contractor has provided to Owner all manufacturer's and other warranties and guarantees required by the Contract Documents, properly signed and endorsed to Owner; and
5. Owner receives the certified final payment request from Architect.

D. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner within ten (10) Days after receipt of Written Notice from Owner requesting such payment.

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

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND FOR PROJECTS IN ARIZONA:

Add the following provisions as section 11.2(A)(5) and (6) of the General Conditions:

5. Have print size no smaller than 10 point type, have at least a one-half inch margin across the top, bottom and the left and right sides from top to bottom, and the first page will have a top margin of at least two inches.

6. Have a provision allowing the prevailing party in a suit on such bond to recover as a part of the judgment reasonable attorneys' fees.

Add the following as section 11.2(D) of the General Conditions:

D. Contractor will record the payment bond, together with a copy of the Contract, which contract must contain a legal description of the land on which the work is to be performed, with the county recorder in the county where the Project is located.

Arkansas

N/A

California

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND FOR PROJECTS IN CALIFORNIA:

Replace section 11.2. of the General Conditions with the following -

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labor and material payment bond each in an amount equal to one hundred percent (100%) of the Contract Sum as security for all obligations arising under the Contract Documents. Such bonds will:Be written on Form AIA Document A312 (1984).

2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.

3. Have a penal sum obligation not exceeding the authorization shown in the current revision on Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".

4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bond son behalf of the surety.

B. The payment bond will be conditioned for the payment in full of the claims of all claimants and will by its terms inure to the benefit of all claimants so as to give a claimant a right of action to enforce liability on the bond.

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

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

E. Before the commencement of Work on the Project, the Contractor will, on behalf of the Owner, record the payment bond together with a copy of the Contract, with the county recorder in the county where the Project is located.

CALIFORNIA NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within fifteen (15) calendar days of final completion of the Project and in compliance with Section 8182 of the California Civil Code, Contractor will, on behalf of the Owner, prepare and file a notice of completion. The notice of completion will comply with the requirements of Chapter 2 (commencing with Section 8100) of Title 1, and will also include all of the following information:

1. If the notice is given only of completion of a contract for a particular portion of the work of improvement as provided in Section 8186, the name of the direct contractor under that contract and a general statement of the work provided pursuant to the contract;
2. If signed by the owner's successor in interest, the name and address of the successor's transferor;
3. The nature of the interest or estate of the owner;
4. The date of completion.

Contractor will submit to Owner the notice of completion for Owner to sign and verify before Contractor files the notice of completion.

Within 10 days of filing for record the notice of completion, Contractor on behalf of Owner will provide a copy of the notice of completion to each potential claimant that has given the Owner preliminary notice.

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.

Colorado

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN COLORADO:

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

F. Owner may withhold 5% retention from each payment request.

COLORADO STATE SALES TAX:

Add the following to the General Conditions:

1. Contractor will make an application to State Department of Revenue for certificate of exemption to permit purchase of building materials for construction of this Project without payment of Sales Tax. Applications and certificates will be on forms provided by the Department of Revenue.

2. Prior to start of construction, Contractor will furnish to the Owner copies of the applications submitted and certificates obtained. Upon receipt of the certificate Contractor will make a copy for each subcontractor involved in the Project and complete it by filling in the subcontractor's name and address and signing it. The original certificate and copies of all certificates that the Contractor issues to subcontractors should be kept at the Contractor's place of business for a minimum of three years.

3. The Owner's sales tax exemption number for the State of Colorado is 98-01587.

Connecticut

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN CONNECTICUT:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

PAYMENT OF RETAINED FUNDS IN CONNECTICUT:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

CONNECTICUT STATE SALES TAX:

Add the following to the General Conditions:

1. Sales of materials and supplies that will be physically and permanently incorporated into the construction project should be exempt from Connecticut state sales tax. The Owner's sales tax exemption number for the State of Connecticut is E-9613.

Delaware

PROGRESS PAYMENTS

Add the following as 9.5.H of the General Conditions:

Owner will pay Contractor an interest penalty on amounts due in the case of each payment not made in accordance with the Contract Documents. The interest penalty will apply to the period beginning on the day after the required date and ending on the date on which payment of that amount due is made and will be computed at the legal rate in effect at the time the obligation to pay a late payment interest penalty accrues. Any amount of an interest penalty which remains unpaid at the end of any 30-day period will be added to the principal amount of the debt and thereafter interest penalties will accrue on such amount.

District of Columbia

PAYMENT OF RETAINED FUNDS IN THE DISTRICT OF COLUMBIA:

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

G. For retention funds withheld pending completion of the project, Owner will repay unpaid retained funds, less any amounts withheld pursuant to Section 10.4, within fifteen (15) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds.

WASHINGTON D.C. SALES TAX:

Add the following to the General Conditions:

1. Materials that will be physically incorporated into and made a part of the Owner's real property may be purchased by the Contractor free of Washington D.C. sales tax.
2. The Owner's tax exempt number is 8661-0185848-001.
3. Contractor is responsible for submitting the Tax Exempt Purchase Certificate Form for real property projects on behalf of the Owner.

Florida

PROGRESS PAYMENTS

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

G. Owner will pay Contractor the balance of amounts withheld as retention from progress payments, less any amounts withheld pursuant to Section 9.4, within fourteen (14) days after any of the following events occur:

1. Pursuant to the terms of the Contract Documents, an architect or engineer certifies that the Project is substantially complete and, within the time provided in the Contract Documents, Owner submits a written punchlist to Contractor and Contractor substantially completes all of the items on the

punchlist.

2. The issuance of a certificate of occupancy for the Project, and within the time provided in the Contract Documents, Owner submits a written punchlist to Contractor and Contractor substantially completes all of the items on the punchlist.
3. Owner or a tenant of Owner takes possession of the Project and, within the time provided in the Contract Documents, Owner submits a written punchlist to Contractor and Contractor substantially completes all of the items on the punchlist.

Any funds retained by Owner beyond the time period specified in this subsection will accrue interest at the rate specified in F.S.A. § 715.12(5), computed from the date the payment is due to the date the payment is received by the Contractor. The time period for Owner to submit a written punchlist to Contractor will be 15 days from the issuance of the certificate of substantial completion, the issuance of the certificate of occupancy, or the date Owner or Owner's tenant takes possession of the Project, whichever first occurs. If no written punchlist is given to Contractor within the time provided in this subsection, interest begins to accrue 14 days after the issuance of the certificate of substantial completion, the issuance of the certificate of occupancy, or the date Owner or Owner's tenant takes possession of the Project, whichever first occurs. If the Project is to be built in phases, this section will apply to each phase of the total Project.

NOTICE OF COMMENCEMENT

Add the following to the General Conditions:

Before commencing the Project, Contractor will record a notice of commencement in the clerk's office and post a certified copy thereof. The notice of commencement will substantially comply with the form in Florida Statutes 713.13 and contain the following information:

1. A description sufficient for identification of the real property to be improved. The description should include the legal description of the property and also should include the street address and tax folio number of the property if available or, if there is no street address available, such additional information as will describe the physical location of the real property to be improved.
2. A general description of the improvement.
3. The name and address of the owner, the owner's interest in the site of the improvement, and the name and address of the fee simple titleholder, if other than such owner. A lessee who contracts for the improvements is an owner as defined under Florida Statutes s. 713.01(23) and must be listed as the owner together with a statement that the ownership interest is a leasehold interest.
4. The name and address of the contractor.
5. The name and address of the surety on the payment bond under Florida Statutes s. 713.23, if any, and the amount of such bond.
6. The name and address of any person making a loan for the construction of the improvements.
7. The name and address within the state of a person other than himself or herself who may be designated by the owner as the person upon whom notices or other documents

may be served under this part; and service upon the person so designated constitutes service upon the owner.

A copy of the payment bond, if any, must be attached at the time of recordation of the notice of commencement.

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

Add the following provisions as section 11.2(D); (E); and (F) of the General Conditions:

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

D. The payment bond will be furnished by the contractor in at least the amount of the original contract price before commencing the construction of the improvement under the Agreement, and a copy of the bond will be attached to the notice of commencement when the notice of commencement is recorded. The bond will be executed as surety by a surety insurer authorized to do business in Florida.

E. The payment bond will also include the following language:

THE CONDITION OF THIS BOND is that if Principal:

1. Promptly makes payment to all lienors supplying labor, material, and supplies used directly or indirectly by Principal in the prosecution of the work provided in the Agreement, the Agreement being made a part of this bond by reference; and

2. Pays Owner all loss, damage, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of default by Principal under paragraph 1 of this bond;

Then this bond is void; otherwise, it remains in full force.

F. The Owner, Contractor, and/or Surety will furnish a true copy of the bond at the cost of reproduction to any lienor demanding it.

Georgia

PROGRESS PAYMENTS

Replace section 9.5.A with the following:

A. Owner will pay Contractor progress payments within the parameters of Sections 9.2 through 9.4 within fifteen (15) Days after Owner receives the certified payment request from Architect.

GEORGIA NOTICE OF COMMENCEMENT

Add the following to the General Conditions:

Not later than fifteen (15) days after Contractor physically commences work on the Project Site, Contractor will file a notice of commencement with the clerk of the superior court in the county in which the Project Site is located. The notice will comply with the requirements of Ga. Code Ann. § 44-14-361.5. Contractor will post a copy of the notice at the Project Site. The notice of commencement will include:

1. The name, address, and telephone number of the Contractor;

2. The name and location of the Project being constructed and the legal description of the real property upon which the improvements are being made;
3. The name and address of the true owner of the property;
4. The name and address of the person other than the owner at whose instance the improvements are being made, if not the true owner of the property;
5. The name and the address of the surety for the performance and payment bonds, if any; and
6. The name and address of the construction lender, if any.

Contractor will be required to give a copy of the notice of commencement to any subcontractor, materialman, or person who makes a written request of the contractor.

Hawaii
N/A

Idaho

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN IDAHO:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

PAYMENT OF RETAINED FUNDS IN IDAHO:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty-five (35) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy. The Owner may condition the final release of the retention upon receipt of satisfactory lien waivers from all persons with actual or potential lien claims on the work of improvement. The Parties agree that interest on any unpaid retainage will not accrue until after 35 days.

Illinois

ILLINOIS STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Add the following as section 9.4.A.8 of the General Conditions:

9.4 **DECISION TO WITHHOLD CERTIFICATION AND PAYMENT**

8. Contractor's failure to provide the notice to Owner as required under section

3.16.

Add the following as section 9.5.H of the General Conditions:

9.5 **PROGRESS PAYMENTS**

H. Notwithstanding any provision to the contrary, Owner is not required to make payments to Contractor until Contractor provides Owner sufficient evidence of Contractor's compliance with the notices required by section 3.16.

NOTICE OF SUBCONTRACTORS FOR PROJECTS IN ILLINOIS:

Add the following as section 3.16 of the General Conditions:

3.16 **CONTRACTOR TO PROVIDE NOTICE OF SUBCONTRACTORS**

Contractor will provide to Owner a statement of names and addresses of all those furnishing for this Project labor, services, material, fixtures, apparatus or machinery, and form or forms work, as well as the amounts due or to become due to such persons / entities. Such notice will be in writing and under oath or verified by affidavit.

ILLINOIS STATE SALES TAX:

Add the following to the General Conditions:

1. Sales of materials to construction contractors for incorporation into the Owner's real estate may be exempt from Illinois state sales tax. (Sales of tools, fuel, lumber for forms, and other end use or consumption items to contractors who do not incorporate these items into real estate are subject to Illinois state sales tax.)
2. Contractor will obtain and provide subcontractors and suppliers with a certificate that
   - States the construction contractor's purchases are for conversion into real estate under a contract with the Owner;
   - Identifies the Owner by name and address; and
   - States on what date the contract was entered into.

   The Contractor will also provide subcontractors and suppliers with the sales tax exemption number for Owner. The Owner's sales tax exemption number for the State of Illinois is E9986-4045-06.

Indiana

INDIANA STATE SALES TAX:

Add the following to the General Conditions:

1. Purchase of materials and supplies might be exempt from Indiana state sales tax. In the event that the Project qualifies for a sales and use tax exception, the Owner's sales tax exemption number for the State of Indiana is 7343965.

Iowa

N/A

Kansas

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN KANSAS:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

PAYMENT OF RETAINED FUNDS IN KANSAS:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

KANSAS STATE SALES TAX:

Add the following to the General Conditions:

1. Upon obtaining a certificate of tax exemption for the project, an exemption from Kansas state sales tax should be allowed for tangible personal property and services purchased by Contractor for the project. Purchases of construction machinery, equipment or tools for the project are not exempt but rather are subject to state sales tax.

2. Prior to beginning work on the project, Contractor will assist the Owner in making a timely application to the State for a certificate of tax exemption for the project. After the certificate of tax exemption is obtained from the State, Contractor will furnish the number of the certificate to all suppliers from whom it makes purchases; and all such suppliers will execute invoices covering the items purchased bearing the number of such certificate. In addition, upon completion of the project, Contractor will timely furnish to Owner a sworn statement (on the form provided by the Kansas Director of Taxation) that all purchases made under such exemption certificate were entitled to the tax exemption. All invoices for such tax exempt purchases will be held by Contactor for a period of five years.

Kentucky

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN KENTUCKY:

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

F. In addition and notwithstanding the foregoing, for payments to Contractor until fifty

percent (50%) of the Project has been completed, Owner may withhold and retain 10% of such payments made to Contractor. For payments to Contractor after the Project has reached fifty percent (50%) completion, Owner may withhold and retain 5% of such payments made to the Contractor.

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy. For the purpose of this subsection, in addition to that definition in the General Conditions, "substantial completion" is the point at which, as certified in writing by the contracting entity, a project is at the level of completion, in strict compliance with the contract, where:

(a) Necessary approval by public regulatory authorities has been given;

(b) The Owner has received all required warranties and documentation; and

(c) The Owner may enjoy beneficial use or occupancy and may use, operate, and maintain the Project in all respects, for its intended purpose.

Louisiana

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

F. Owner may withhold 10% retention from each payment request. When the Contract Sum exceeds fifty thousand dollars, such retention funds will be held in an interest bearing account.

Maine

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

F. Owner may withhold 5% retention from each payment request.

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

MAINE STATE SALES TAX:

Add the following to the General Conditions:

1. The General Contractor may be exempt from Maine state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 20460.

Maryland

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN MARYLAND:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

MARYLAND STATE SALES TAX:

Add the following to the General Conditions:

1. The General Contractor may be exempt from Maryland state sales tax on its purchases for this project.
2. The Owner's tax exempt number is 29020063.

Massachusetts

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN MASSACHUSETTS:

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

F. In addition and notwithstanding the foregoing, Owner may withhold 5% retention from each payment request.

MASSACHUSETTS NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within fourteen (14) calendar days of Substantial Completion of the Project, and in compliance with M.G.L. c. 149, § 29F, Contractor will submit to the Owner notice of substantial completion, in substantially the following form, stating the date on which the Project was substantially completed:

NOTICE OF SUBSTANTIAL COMPLETION

Under M.G.L. c. 149, § 29F

For [project name]

To [project owner]:

The undersigned hereby gives notice that the project was substantially complete, as defined under M.G.L. c. 149, § 29F, on [date of substantial completion]. This notice is certified as made in good faith on [date of notice].

By_____

[prime contractor]

Accepted:

By_____

[project owner]

Dated: _____

B. Owner will accept or reject the notice of substantial completion within 14 days of receipt of the notice. Acceptance will be indicated by Owner signing the notice or by Owner's failure to act within 14 days of receipt of the notice. If Owner rejects the notice, Owner will do so in writing and will include in its rejection the factual and contractual basis for the rejection and a certification that the rejection is made in good faith. If the notice is rejected, the dispute will be subject to the dispute resolution provisions of the Contract Documents which, absent contrary contract provisions, will be commenced by the Contractor within 7 days of receipt of the rejection.

C. Not later than 14 days after Owner accepts the notice of substantial completion, or once a dispute is resolved, Owner will provide a written list describing incomplete or defective work items and deliverables required of Contractor. The list will be deemed certified by Owner as made in good faith.

D. Not later than 21 days after the acceptance of the notice of substantial completion, or the resolution of a dispute, Contractor will submit to each person from whom Contractor is withholding retainage a written list describing all incomplete or defective work items and deliverables required by the person under the person's contract for construction, which list may include items beyond those on the Owner's list. The list will be certified by Contractor as made in good faith.

E. 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.

MASSACHUSETTS STATE SALES TAX:

Add the following to the General Conditions:

1. The General Contractor and its subcontractors should be exempt from Massachusetts state sales tax on purchases for this project. Contractors will obtain and complete state form ST-5C and submit it to Owner for signature and return. Contractor will then use the completed Purchase Certificate in making purchases for this Project.
2. The Owner's tax exempt number is E870-234-341.

Michigan

NOTICE OF COMMENCEMENT

Add the following to the General Conditions:

Before commencing the Project, Contractor will record a Notice of Commencement in the office of the register of deeds for each county in which the real property to be improved is located and post a copy thereof in a conspicuous place on the property. The notice of commencement will substantially comply with the form in Michigan Compiled Laws 570.1108 and contain the following information:

1. The legal description of the real property on which the improvement is to be made conforming with Michigan Compiled Laws sections 560.212 and 560.255.
2. The name, address, and capacity of the signor for the Owner.
3. The name and address of Owner's designee signing on behalf of Owner.
4. The name and address of the general contractor, if any.
5. The following statement:

   To lien claimants and subsequent purchasers:

   Take notice that work is about to commence on an improvement to the real property described in this instrument. A person having a construction lien may preserve the lien by providing a notice of furnishing to the above-named designee and the general contractor, if any, and by timely recording a claim of lien, in accordance with law.

   A person having a construction lien arising by virtue of work performed on this improvement should refer to the name of the Owner or lessee and the legal description appearing in this Notice. A person subsequently acquiring an interest in the land described is not required to be named in a claim of lien.

   A copy of this Notice with an attached form for notice of furnishing may be obtained upon making a written request by certified mail to the above-named Owner or lessee; the designee; or the person with whom you have contracted.
6. The name and address of the person preparing the Notice.
7. An affidavit of the Owner or the agent of the Owner which verifies the Notice.

Contractor must provide to Owner a copy of the Notice as well as prepare and provide to Owner the Affidavit verifying the Notice for Owner's signature no later than seven (7) days prior to the time Contractor needs to receive the Affidavit back from Owner in order for Contractor to timely finalize and record the Notice of Commencement with its attachments.

In addition to recording and posting the Notice of Commencement, Contractor will provide the Notice of Commencement and a blank notice of furnishing (described in Michigan Compiled Laws 570.1108), from time to time, to the property Owner as well as all subcontractors, laborers, or suppliers who request the Notice of Commencement.

CONTRACTOR TO PROVIDE SWORN STATEMENTS

Notwithstanding all other terms and conditions of the Contract Documents, Owner has the right (but no obligation) to require Contractor to submit to Owner a sworn statement that complies with Michigan Compiled Laws 570.1110 prior to the time payment is due or otherwise from time to time.

Minnesota

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN MINNESOTA:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

Mississippi

N/A

Missouri

PAYMENT OF RETAINED FUNDS IN MISSOURI:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

MISSOURI STATE SALES TAX:

Add the following to the General Conditions:

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax in accordance with Section 144.062 RSMO as modified by the 1994 Missouri General Assembly.
2. The Owner will furnish a 'Missouri Project Exemption Certificate' and a MO Tax Exemption Letter' to the Contractor.
3. The Owner's tax exempt number is 12473863.

Montana

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN MONTANA:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

Nebraska

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN NEBRASKA

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 10% of payments made to Contractor. If the scope of the work for Contractor from which retention is withheld is fifty (50) percent complete, Owner may withhold no more than five percent of any additional progress payment as retention if Contractor provides or has provided satisfactory and reasonable assurances of continued performance and financial responsibility to complete the Work.

NEBRASKA STATE SALES TAX:

Add the following to the General Conditions:

1. Pursuant to applicable laws, Contractor will make application to The Nebraska Department of Revenue to act as prime contractor for approval to use Owner's tax exempt number to permit the purchase of building materials for construction of this Project without payment of sales and use tax. Contractor may delegate its authority to its subcontractors as allowed by law to act as the purchasing agent for tax exemption purposes. Subcontractors will follow the same application and compliance requirements as the Contractor. Applications will be on forms provided by The Nebraska Department of Revenue.
2. Prior to start of construction, Contractor will furnish copies of the submitted application forms to Owner.

Nevada

NEVADA NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 108.228 Nevada Revised Statutes, Contractor will, on behalf of the Owner, file with the office of the county recorder of the county where the property is located, and copy to Owner, a notice of completion which will include, without limitation, the following:

1. The date of completion of the work of improvement;
2. The owner's name, the address of the owner, and the nature of the title of any person signing the notice;
3. A description of the property sufficient for identification;
4. The name of the prime contractor or contractors, if any.

Contractor will verify the notice of completion on the Owner's behalf.

B. Upon recording the notice, Contractor will within ten (10) days deliver a copy of the

notice by certified mail to each prime contractor and each potential lien claimant who, before the notice was recorded, either submitted a request to the owner to receive the notice or delivered a preliminary notice of right to lien.

C. 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.

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN NEVADA:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

New Hampshire

N/A

New Jersey

NEW JERSEY STATE SALES TAX:

Add the following to the General Conditions:

1. The General Contractor should be exempt from New Jersey state sales tax on its purchases for this project.
2. The Owner's tax exempt number is EO-237-300-405.

New Mexico

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN NEW MEXICO:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

NEW MEXICO STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace Sections 9.5 subsections A, C and G of the General Conditions with the following:

9.5 PROGRESS PAYMENTS

A. Owner will pay Contractor progress payments within the parameters of Sections 9.2 through 9.4 within twenty-one (21) days after Owner receives the certified payment request from Architect.

C. Contractor and all Subcontractors will, within seven (7) days after receipt of payment, pay to their subcontractors and suppliers the amounts paid for work performed and materials supplied on the construction project.

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within twenty-one (21) days after Contractor submits its undisputed payment request for retained funds and delivers to Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety.

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

9.6 FINAL PAYMENT

A. Owner will make full and final payment within twenty-one (21) days of the completion of all of the following requirements:

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

PAYMENT OF SUBCONTRACTORS AND MATERIALMEN FOR PROJECTS IN NEW MEXICO:

Replace Section 5.2.B of the General Conditions with the following:

5.2 SUBCONTRACTUAL RELATIONS

B. Contractor agrees to make prompt payment to its Subcontractors within seven (7) days of Contractor's receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which payment was made by Owner. Failure of Contractor to make payment within that seven (7) day period will subject Contractor to pay interest to its Subcontractors on the undisputed amount at one and one-half percent per month or fraction of a month until payment is issued. Contractor agrees to require of its Subcontractors that they make prompt payment to their subcontractors within seven (7) days of their receipt of payment from the Contractor for that portion of the funds received which represents their subcontractor's portion of the Work completed and to be subject to interest at one and one-half percent per month on undisputed amounts not paid to their subcontractors within that seven (7) day period.

New York

PAYMENT OF RETAINED FUNDS IN NEW YORK:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4

within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

NEW YORK STATE SALES TAX:

Add the following to the General Conditions:

1. Exemption from tax is allowed for materials sold to the Contractor for this project. For equipment rentals as well as any materials not used in the building, the Contractor is subject to New York sales tax.
2. The Owner's tax exempt number is 105318.

North Carolina

NORTH CAROLINA STATE SALES TAX:

Add the following to the General Conditions:

1. At end of each calendar quarter, Contractor will provide Owner with the following information from invoices for materials and sub-contract work where North Carolina sales tax has been paid:
   a. Date of invoice
   b. Amount of tax
   c. Name and address of person or company.

LIEN AGENT

Add the following to the General Conditions:

Where the Contract Sum exceeds Thirty Thousand Dollars ($30,000), Contractor on behalf of Owner will, simultaneous with the execution of the Agreement and at Contractor's sole expense, obtain and maintain throughout the duration of the Project a lien agent for the Project in satisfaction of North Carolina statutes G.S. § 44A-11.1 & § 44A-11.2. In addition, Contractor will satisfy all notice requirements under applicable law regarding the lien agent, including, without limitation, providing written information of the lien agent in the building permit and/or on a sign posted and maintained on the Project Site.

North Dakota

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN NORTH DAKOTA:

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

F. In addition and notwithstanding the forgoing, Owner may also withhold and retain 10% of payments made to Contractor until the work is 50% complete. Thereafter, Owner may continue to hold such retained amounts until completion but no additional retainage based solely on a percentage of the payments being made will be withheld from future payments.

Ohio

OHIO STATE SALES TAX:

Add the following to the General Conditions:

1. Contractor's purchases of materials to be used for this project should be exempt from Ohio state sales tax. Contractor will issue exemption certificates to suppliers.

OHIO STATE NOTICE OF COMMENCEMENT:

Add the following to the General Conditions:

1. In accordance with State of Ohio lien laws, Contractor will assist the Owner in filing a Notice of Commencement with the County Recorder of the county in which the Project is located. Contractor will be provided with a copy of that notice. Contractor will be responsible for distributing notice to subcontractors and suppliers.

Oklahoma

OKLAHOMA STATE SALES TAX

Add the following to the General Conditions:

1. The General Contractor and its subcontractors should be exempt from Oklahoma state sales tax on purchases for this project.
2. The Owner will provide a copy of its exemption documentation.
3. In compliance with Oklahoma Rule 710:65-7-13, Contractor will, on the face of each invoice or sales receipt, set out the name of the Owner, that the purchases are being made on behalf of the Owner, and that the purchases are necessary for the completion of the Agreement.

Oregon

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN OREGON:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

PAYMENT OF RETAINED FUNDS IN OREGON:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND FOR OREGON PROJECTS

Add the following as section 11.2.E and 11.2.F of the General Conditions:

E. The duration of the bonds must include the period during which claims of lien or notices of other encumbrances based on the construction performed under the contract may be filed under applicable law.

F. The bonds must include, but not be limited to, provisions to the effect that the bonds ensure that:

1. The Contractor's obligations under the Contract Documents are faithfully performed;
2. Contractor payments are promptly made to all persons supplying labor or materials to the Contractor or subcontractors for prosecution of the Work provided in the Contract Documents;
3. All contributions due the Industrial Accident Fund and the Unemployment Compensation Trust Fund from the Contractor or subcontractors in connection with the performance of the Work are made promptly; and
4. All sums required to be deducted and retained from the wages of employees of the Contractor or subcontractors pursuant to the Personal Income Tax of 1969, are paid over to the Department of Revenue.

OREGON NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within five (5) calendar days of final completion of the Project, Contractor will, on behalf of the Owner, file with the recording officer of the county in which the property, or some part thereof, is situated, a notice of completion in compliance with O.R.S. 87.045. The completion notice will state in substance the following:

> Notice hereby is given that the building, structure or other improvement on the following described premises, (insert the legal description of the property including the street address, if known) has been completed.
>
> All Persons claiming a lien upon the same under the

Construction Lien Law hereby are notified to file a claim of lien as required by ORS 87.035 (Perfecting Lien)

Dated _____, 2_____

Original Contractor

Address: _____

B. Contractor will post the notice of completion on the date it bears in some conspicuous place upon the land or upon the improvement situated thereon. Within five days from the date of the posting of the notice, Contractor will record with the recording officer of the county in which the property, or some part thereof is situated, a copy of the notice, together with an affidavit endorsed thereon or attached thereto, made by the person posting the notice, stating the date, place, and manner of posting the notice. The Contractor will have the recording officer endorse upon the notice the date of the filing thereof and record and index the notice in the statutory lien record as required by ORS 87.050.

Pennsylvania

PAYMENT OF RETAINED FUNDS IN PENNSYLVANIA:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

PENNSYLVANIA NOTICE OF COMMENCEMENT:

Add the following to the General Conditions:

If the Contract Sum is over $1,500,000, Contractor will, on behalf of Owner, file a Notice of Commencement with the State Construction Notices Directory, pursuant to the requirements of 49 P.S. § 1501.3. The notice of commencement will substantially comply with the 49 P.S. § 1501.3 and contain the following information:

1. The full name, address and e-mail address of the Contractor.
2. The full name and location of the searchable Project.
3. The county in which the searchable Project is located.
4. The legal description of the property upon which the improvements are being made, including the tax identification number of each parcel included in the searchable Project.
5. Full name, address and e-mail address of the searchable Project Owner of record of the property and the searchable Project being constructed.

6. If applicable, the full name, address and e-mail address of a surety for the performance and payment bonds and the bond numbers.
7. The unique identifying number that is assigned to the Notice of Commencement pursuant to section 49 P.S. § 1501.1(e)(1).

Contractor will, on behalf of owner, post a copy thereof in a conspicuous place on the Project Site before work commences on the Project to include the unique identifying number assigned under 49 P.S. § 1501.1(e)(1) and take reasonable measures to ensure that the Notice of Commencement remains posted at the searchable Project until completion of the Project. For purposes of this paragraph, the term "reasonable measures" means the reposting of notice within 48 hours after becoming aware of or being notified verbally, in writing or by e-mail, that the notice is not posted.

PENNSYLVANIA STATE SALES TAX:

Add the following to the General Conditions:

1. Sales of certain materials to construction contractors for incorporation into the Owner's real estate may be exempt from Pennsylvania state sales tax. Pennsylvania law 72 P.S. § 7201 allows construction contractors to claim the Owner's sales tax exemption for "Building Machinery and Equipment" that is transferred pursuant to the construction contract to the Owner. "Building Machinery and Equipment" is "[g]eneration equipment, storage equipment, conditioning equipment, distribution equipment and termination equipment" limited to the following:
    i. air conditioning limited to heating, cooling, purification, humidification, dehumidification and ventilation;
    ii. electrical;
    iii. plumbing;
    iv. communications limited to voice, video, data, sound, master clock and noise abatement;
    v. alarms limited to fire, security and detection;
    vi. control system limited to energy management, traffic and parking lot and building access;
    vii. medical system limited to diagnosis and treatment equipment, medical gas, nurse call and doctor paging;
    viii. laboratory system;
    ix. cathodic protection system; or
    x. furniture, cabinetry and kitchen equipment.

    The definition also explicitly includes: boilers, chillers, air cleaners, humidifiers, fans, switchgear, pumps, telephones, speakers, horns, motion detectors, dampers, actuators, grills, registers, traffic signals, sensors, card access devices, guardrails, medial devices, floor troughs and grates and laundry equipment, together with integral coverings and enclosures, whether or not the item constitutes a fixture or is otherwise affixed to the real

estate whether or not damage would be done to the item or its surroundings upon removal or whether or not the item is physically located within a real estate structure.

However, the term "building machinery and equipment" will not include guardrail posts, pipes, fittings, pipe supports and hangers, valves, underground tanks, wire, conduit, receptacle and junction boxes, insulation, ductwork and coverings thereof.

2. Contractor will obtain and provide subcontractors with Pennsylvania Exemption Certificates—Pennsylvania Form Rev-1220 AS—to be filled out and used when purchasing tax-exempt "Building Machinery and Equipment" for the project. For purposes of filling out Form Rev-1220 AS, the Owner's tax exempt number is 75-259-773.
3. If Contractor or any subcontractor fails to obtain a sales-tax exemption when purchasing "Building Machinery and Equipment," the Contractor or subcontractor will be responsible for seeking its own refund of sales tax expending by filing a Refund Petition with the Pennsylvania Department of Revenue Board of Appeals.

Rhode Island

RHODE ISLAND STATE SALES TAX:

Add the following to the General Conditions:

1. Exemption from Rhode Island state sales tax should be allowed for materials purchased by Contractor for this project. Equipment rentals as well as materials not used in the building are subject to state sales tax.
2. The Owner's tax exempt number is 11034.

South Carolina

N/A

South Dakota

TAXES

Replace section 3.5.A of the General Conditions with the following:

A. Contractor will pay all privilege, sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work (including without limitation all excise tax).

NOTICE OF COMMENCEMENT

Add the following to the General Conditions:

Contractor will file, on behalf of Owner, a notice of project commencement with the register of deeds of the county in which the improved premises are situated.in accordance with the requirements of S.D.§ 44-9-50. The notice of project commencement will contain the following information:

1. The name and address of the person filing the notice of project commencement;
2. The name and address of the owner or developer;
3. A general description of the improvement; and
4. The location of the project, including the legal description of the property.

Contractor will file the notice within thirty (30) days of the commencement of work, along with a filing fee as provided in subdivision 7-9-15(3).

Tennessee

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN TENNESSEE:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain five percent (5%) of payments made to Contractor. These retained funds will be released upon the expiration, discharge, or satisfaction of all liens and pursuant to the requirements set forth in Section 9.6.A. The retained funds less any amounts withheld pursuant to Section 9.4 will be paid within 90 days after issuance of certificate of substantial completion, or 90 days after completion, whichever is first, and Contractor submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy. In the event the Contract Sum is $500,000 or greater, the retained funds will be placed in a separate interest bearing account.

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND FOR PROJECTS IN TENNESSEE:

Replace section 11.2. of the General Conditions with the following -

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner the following bonds as security for all obligations arising under the Contract Documents: (1) a performance bond in an amount equal to one hundred percent (100%) of the Contract Sum; (2) A labor and material payment bond, which the Contractor will ensure will: (a) be in a penal sum at least equal to one hundred percent (100%) of the Contract Sum, (b) be in favor of the Owner, (c) have the written approval of the Owner endorsed on it, (d) be executed by the Contractor as principal and by a corporate surety authorized and admitted to do business in the state of Tennessee and license by the state of Tennessee to executed bonds as surety, (e) be conditioned on prompt payment for every laborer, subcontractor or materialman contracted with or employed to work on buildings, fixtures, machinery, or improvements, or to furnish

materials for the same, whether such laborer, subcontractor or materialman was employed or contracted with by the person who originally contracted with the Owner of the premises, or by an immediate or remote subcontractor acting under contract with the Contractor, or any subcontractor, and (f) be conditioned on prompt payment for usual extras not exceeding fifteen percent (15%) of the Contract Sum. In addition, the payment bond will be amended to indicate the following on the face of the bond: "This Payment Bond is hereby amended and modified so as to be deemed to comply with all requirements of Tennessee Code section 66-11-142(b)."

In addition, the performance and payment bonds will:

1. Be written on Form AIA Document A312 (1984);
2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".
4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.

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

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

D. At any time, Owner may record a copy of the payment bond with the register of deeds and/or other appropriate authority for the purpose of discharging any liens registered against the Owner's property. Upon the recording of the payment bond with the register of deeds or other appropriate authority, Contractor and/or Owner will notify the surety executing the bond of such bond recording for lien discharge. Contractor hereby consents to Owner's recording, authorizes Owner to record, and/or designates Owner as Contractor's agent for recording the payment bond to discharge liens. Contractor also consents, authorizes, and designates Owner to provide notification to the surety. Notwithstanding, such consents, authorizations and designations do not preclude or nullify a recording of the payment bond and attendant notification thereof to the surety by the Contractor.

TENNESSEE NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within five (5) calendar days of final completion of the Project and in compliance with Tenn. Code Ann. § 66-11-143, Contractor will, on behalf of the Owner, file with the office of the register of deeds in the county where the property or any affected part of the property is located, and copy to Owner, a notice of completion which will include, without limitation, the following:

1. The legal name of the owner or owners of the real property;
2. The name of the prime contractor or prime contractors;
3. The location and description of the real property;
4. Date of the completion of the improvement

5. A statement that a transfer of ownership of all or a part of the real property or an interest in the real property and encumbrance on the real property, or a settlement of the claims of parties entitled to the benefits of this part, will take place not less than thirty (30) days after the date of the recording of the notice of completion in the register's office.

6. The name and address of the person, firm, or organization on which parties entitled to the benefits of this chapter may serve notice of claim;

7. Acknowledgment by the person filing the notice, or by that person's agent or attorney;

8. The name and address of the preparer of the instrument in compliance with § 66-24-115.

B. Contractor will verify the notice of completion on the Owner's behalf. If a remote contractor has served a required notice of nonpayment pursuant to § 66-11-145, then Contractor will simultaneously serve a copy of the notice of completion on the remote contractor. Upon recording the notice, Contractor will within ten (10) days deliver a copy of the notice by certified mail to each prime contractor.

C. 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.

Texas

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN TEXAS:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 10% of payments made to Contractor. These retained funds less any amounts withheld pursuant to Section 9.4 will be released upon the expiration, discharge, or satisfaction of all liens and pursuant to the requirements set forth in Section 9.6.A. Such funds will be released no later than 30 days after project completion.

TEXAS STATE SALES TAX:

Add the following to the General Conditions:

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax under Texas Tax Code §151.310. The general Contractor, when purchasing materials and equipment for this Project, should advise the vendors that Owner is an exempt organization and that no sales tax will be paid.

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND FOR PROJECTS IN TEXAS:

Replace section 11.2 of the General Conditions with the following -

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner the following bonds as security for all obligations arising under the Contract Documents: (1) a performance bond in an amount equal to one hundred percent (100%) of the Contract Sum; (2) A labor and material payment bond, which the Contractor will ensure will: (a) be in a penal sum at least equal to one hundred percent (100%) of the Contract Sum, (b) be in favor of the Owner, (c) have the written approval of the Owner endorsed on it, (d) be executed by the Contractor as principal and by a corporate surety authorized and admitted to do business in the state of Texas and licensed by the state of Texas to execute bonds as surety, (e) be conditioned on prompt payment for all labor, subcontracts, materials, specially fabricated materials, and normal and usual extras not exceeding 15 percent of the Contract Sum; and (f) clearly and prominently display on the bond or on an attachment to the bond either: (i) the name, mailing address, physical address, and telephone number, including the area code, of the surety company to which any notice of claim should be sent; or (ii) the toll-free number maintained by the Texas Department of Insurance under Subchapter B, Chapter 521, Insurance Code, and a statement that the address of the surety company to which any notice of claim should be sent may be obtained from the Texas Department of Insurance by calling the toll-free telephone number.

In addition, the performance and payment bonds will:

1. Be written on Form AIA Document A312 (1984).
2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List."
4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bond on behalf of the surety or sureties.

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

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

D. Contractor will record the payment bond together with a copy of the Contract, with the county clerk in the county where the Project is located.

Utah

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN UTAH:

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

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

PAYMENT OF RETAINED FUNDS IN UTAH:

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

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

UTAH STATE SALES TAX:

Add the following to the General Conditions:

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.
2. The Owner's tax exempt number is 11871701-002-STC.

UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:

Add the following to the General Conditions:

A. Contractor will file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:

1. The completion of performance time under the original contract for construction work is greater than 120 days;
2. The total original construction contract price exceeds $500,000; and
3. The original contractor or owner has not obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

UTAH NOTICE OF COMPLETION:

Add the following to the General Conditions:

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor will file with the State Construction Registry, and copy to Owner, a notice of completion which will include, without limitation, the following:

1. The name, address, telephone number, and email address of the person filing the notice of completion;
2. The name of the county in which the Project and/or Project site is located;

3. The date on which final completion is alleged to have occurred;

4. The method used to determine final completion; and

5. One of the following:

   a. The tax parcel identification number of each parcel included in the Project and/or Project site;

   b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or

   c. The entry number of the building permit issued for the Project.

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

UTAH PROGRESS PAYMENTS AND FINAL PAYMENT:

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

9.5 PROGRESS PAYMENTS

A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after:

1. Contractor has submitted a progress payment request;

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

3. Owner receives the certified payment request from Architect.

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

9.6 FINAL PAYMENT

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

Vermont

PAYMENT OF RETAINED FUNDS IN VERMONT:

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

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled

"Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

VERMONT STATE SALES TAX:

Add the following to the General Conditions:

1. Purchases of building materials and supplies should be exempt from Vermont state sales tax if those materials and supplies are consumed in the construction of this Project.
2. The Owner's tax exempt number is 450-870234341F-01.

Virginia
N/A

Washington

WASHINGTON STATE CONTRACTOR DISCLOSURE NOTICE:

Add the following to the General Conditions:

1. For Projects in state of Washington, the Contractor will provide a 'job site' disclosure notice in accordance with Statute 60.04.230. Contractor will post this notice at the job site. This notice will detail the following:
   a. Legal description and street address of the construction site.
   b. Property Owner's name, address, and phone number as shown in the Contract Documents.
   c. Contractor's registration number and identification.
   d. Contractor's business name, address, and telephone number.

WASHINGTON STATE CONTRACT SUM (PRINCIPAL AND SALES TAX IDENTIFIED SEPARATELY):

Replace paragraph 5.a of the Agreement between Owner and Contractor with the following:

5. **Contract Sum.**
   a. Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the Contract Sum in the amount of _____ Dollars (_____) plus applicable sales tax, subject to additions and deductions as provided in the Contract Documents.

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN WASHINGTON:

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

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor. In lieu of such 5% retainage, Contractor may tender to Owner a retainage bond in an amount not to exceed 5% of the moneys earned by the Contractor.

PAYMENT OF RETAINED FUNDS IN WASHINGTON:

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

A. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty (30) Days after Contractor achieves Substantial Completion, submits its payment request for retained funds and delivers to Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, and obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds.

West Virginia

WEST VIRGINIA STATE SALES TAX:

Add the following to the General Conditions:

1. Purchases of building materials and supplies may be exempt from West Virginia state sales tax if those materials and supplies are consumed in the construction of this Project.

The Owner's tax exempt number is 23-7300405-001.

Wisconsin

WISCONSIN STATE SALES TAX:

Add the following to the General Conditions:

1. Purchases of building materials and supplies may be exempt from Wisconsin state sales tax if those materials and supplies are consumed in the construction of this Project.
2. The Owner's tax exempt number is ES 6221.

Wyoming

N/A

END OF DOCUMENT

DIVISION 07: THERMAL AND MOISTURE PROTECTION

DIVISION 23: HVAC PIPING INSULATION

END OF TABLE OF CONTENTS

SECTION 07 3113

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:
   1. Division 22: Plumbing vent piping.
   2. Division 23: HVAC flues and air piping.

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

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

1.2 REFERENCES

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

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

f. ASTM D3462/D3462M-16, 'Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules'.
g. ASTM D4869/D4869M-16a, 'Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing'.
h. ASTM D7158/D7158M-17, 'Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)'.
i. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
j. ASTM E108-17, 'Standard Test Methods for Fire Tests of Roof Coverings'.
k. ASTM F1667-18, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.
l. Granules / Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules'.

2. International Building Code (IBC) (2018 Edition or latest edition adopted by AHJ):
   a. Chapter 15, 'Roof Assemblies And Rooftop Structures'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference:
      a. Roofing Installer's Foreman and those responsible for installation of roofing to be in attendance. Include Shingle Manufacturer's Representative if available.
   2. Schedule pre-installation conference at project site after completion of tear off but before installation of any roofing system component.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review if Project is in high wind area.
      b. Review if Project could have ice dam problems.
      c. Review if Project could have fungus-algae resistance problems.
      d. Review Shingle Manufacturer's ventilation requirements.
      e. Review Shingle Manufacturer's Ambient Conditions requirements.
      f. Review existing roof conditions including moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
      g. Review proper valley, flashing, penetrations, secondary underlayment, sealants, and nailing requirements.
      h. Review racking installation method is not permitted.

B. Sequencing:
   1. Sequence of Roofing Materials (see valley flashing detail in Contract Drawings):
      a. Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes of secondary underlayment.
      b. Metal drip edge.
      c. Secondary underlayment.
      d. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley.
      e. Install one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
      f. Install formed valley metal over strip of primary underlayment.
      g. Apply 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).
      h. Primary underlayment.
      i. Asphalt shingles.
      j. Counter flashings over step flashing.
   2. Coordinate sequencing of products furnished in Section 07 7226: 'Ridge Vents'.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Color and style selection.

2. Samples:
   a. Full size shingle.

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

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Asphalt Shingles:
            a) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
            b) Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.
         2) Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.
      b. Record Documentation:
         1) Manufacturers Documentation:
            a) Manufacturer's literature.
            b) Color selections.
            c) Test and evaluation reports.
         2) Roofing Inspection Documentation:
            a) Include copy of roof inspection report.

3) Certificate: Installer statement of compliance for performance requirements.
4) Certificate: Installer completion of certified training.
5) Test And Evaluation Report: UL fire-resistance rating test report.
6) Test And Evaluation Report: NFPA 101 Class A approval.
7) Test And Evaluation Report: Wind resistance requirements required.

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

1.5 QUALITY ASSURANCE

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

B. Qualifications:
1. Manufacturer:
a. Asphalt Shingles:
1) Asphalt shingles are required to be produced under quality control program administered by inspection agency currently accredited by ICBO ES or recognized by National Evaluation Service, Inc. Quality control manual developed in consultation with approved agency, and complying with ICBO ES Acceptance Criteria for Quality Control Manuals (AC10), must be submitted.
b. Underlayment:
1) Underlayment is required to be manufactured under approved quality control program with inspections by inspection agency accredited by International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.
2) Quality documentation complying with ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for roof underlayment.
2. Roof Installer Foreman Qualifications:
a. Requirements of Section 01 4301 applies but not limited to the following:
1) Provide documentation if requested by Architect.
a) Approved and authorized by Roofing Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's warranty before bid.
b) Completed Shingle Manufacturer's certified trained.

c) Have thorough knowledge of installing asphalt shingle roofing and have minimum of five (5) years roofing experience.
d) Current license for the city, county, and state where project is located and license for specific type of roofing work to be performed.
e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
f) Flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.

3. Roof Installer:
   a. Provide 'Roof Installer Workmanship Warranty' as specified in Warranty in Part 1 of this specification.

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. General:
      a. Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
   2. Shingles:

a. Do not install shingles at lower temperatures than allowed by Shingle Manufacturer for application.

3. Underlayment:
   a. Install self-adhering sheet underlayment within range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Special Warranty:
   1. Shingle Manufacturer's special forty (40) year minimum labor and material warranty written for The Church of Jesus Christ of Latter-day Saints program, including but not limited to:
      a. CertainTeed:
         1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
      b. GAF:
         1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
      c. Malarkey (Alaska or Canada projects only):
         1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
      d. Owens Corning:
         1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
   2. Standard Wind Areas:
      a. Roofing system will resist blow-offs in winds up to 110 mph (177 kph) for ten (10) years when installed as specified below.
      b. Meet requirements of ASTM D3161/D3161M UL Class D.
   3. High Wind Areas:
      a. Roofing system will resist blow-offs in winds between 110 mph (177 kph) and up to 130 mph (209 kph) for ten (10) years when installed as specified below.
         1) Meet requirements of ASTM D3161/D3161M UL Class F.
         2) Meet requirements of ASTM D7158/D7158M UL Class H.
         3) Shingle Manufacturer's starter shingles are installed on all eve and rakes.
         4) Shingle Manufacturer's hip and ridge shingles are installed where shown on Contract Documents.
         5) Shingle Manufacturer's recommended nailing pattern is followed.
   4. Algae resistance for fifteen (15) years.
   5. Roof Installer Workmanship Warranty:
      a. Provide ten (10) year workmanship warranty on roofing system and related components, including flashings, and responsible for all repairs to roofing system and related components due to roof installer's own negligence or faulty workmanship:
         1) In the event that, during ten (10) year period following installation, Roof Installer defaults or fails to fulfill its obligation in relation to workmanship warranty as specified in Manufacturer's Agreement, Manufacturer will assume that obligation for remainder of ten (10) year period following original installation and Owner shall have no obligation to make or pay for repairs to or materials for roofing system that are necessary due to Roof Installer's negligence or faulty installation during that period.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. CertainTeed Roofing Products, Valley Forge, PA. www.certainteed.com.
1) Contact Information: Wendy Fox, (800) 404-9880 wfox@dataworksintl.com.
b. GAF Materials Corp., Wayne, NJ www.gaf.com.
1) Contact Information: John Arellano (office) (210) 896-1041 (fax) (210) 259-8050.
c. Malarkey Roofing Products, Portland OR:
1) Contact Information: Joe Russo (425) 418-3456 Joe.Malarkey@outlook.com.
d. Owens Corning, Toledo, OH www.ownscorning.com.
1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution. Any distribution questions, contact Area Sales Manager.
2) For all other questions, Contact: Sam Baroudi (419) 248-7754 sam.baroudi@owenscorning.com. or Robert Hill (801) 553-2417 Robert.Hill@owenscorning.com.

B. Components:
1. Shingles And Underlayment:
a. Fiberglass mat shingles meeting or exceeding requirements of:
1) UL Class A Fire Resistance.
2) ASTM D3018/D3018M, Type I (self sealing).
3) Standard Wind Areas: ASTM D3161/D3161M UL Class D.
4) Impact Resistant Shingles: Meet requirements of UL 2218 Class 4 Impact, ASTM E108 Class A Fire Resistance, ASTM D3161/D3161M Class F Wind, ASTM D7158/D7158M Class H Wind, ASTM D3018/D3018M Type 1, ASTM D3462/D3462M, and UL 790 Class A Fire Resistance.
5) Secondary Underlayment: Meet requirements of ASTM D1970/D1970M and UL 790 Class A Fire Resistance.
6) Primary (Synthetic) Underlayment: Meet requirements of ASTM D226/D226M and ASTM D4869/D4869M (physical properties only) or ASTM D1970/D1970M and ASTM E108 Class A Fire.
7) Integral algae resistance:
a) Use compatible flashing and trim materials to avoid electrolysis problem with material used in algae shingles.
8) Color as selected by Architect from Shingle Manufacturer's full color line.
b. Category Three Approved Manufactures and Products. See Section 01 6200 for definitions of Categories:
1) CertainTeed:
a) Shingles:
(1) High Wind: Landmark Premium.
(2) Impact Resistant: Landmark IR.
(3) Hip And Ridge Shingles: Shadow Ridge or Laminate Accessory for shingle used.
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Diamond Deck.
c) Secondary Underlayment Under Shingles:
(1) WinterGuard Granular.
or
(2) WinterGuard Sand.
or
(3) WinterGuard High Tack/High Temperature.
d) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
2) GAF:

a) Shingles:
(1) High Wind: Timberline Ultra HD.
(2) Impact Resistant: Timberline ArmorShield II.
(3) Hip And Ridge Shingles: TimberTex or Ridglass.
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Tiger Paw.
c) Secondary Underlayment Under Shingles:
(1) Weatherwatch.
or
(2) StormGuard.
d) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

3) Malarkey (Alaska or Canada projects):
a) Shingles:
(1) High Wind: Polymer Modified SBS Legacy.
(3) Impact Resistant: Polymer Modified SBS Legacy.
(4) Hip And Ridge Shingles: Modified SBS Hip and Ridge Strips #225 10 inches (254 mm) or #227 12 inches (305 mm).
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Secure Start #1030.
(2) Polymer Modified SBS Underlayment: Right Start UDL.
c) Secondary Underlayment Under Shingles:
(1) Arctic Seal Self-Adhering underlayment #401.
d) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

4) Owens Corning:
a) Note:
(1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution.
(2) Any questions, contact Manufactures Area Sales Manager.
b) Shingles:
(1) High Wind: Duration Premium shingles.
(2) Impact Resistant: Duration Storm Impact-Resistant Shingles with Weather-Guard.
(3) Hip And Ridge Shingles: DecoRidge Hip & Ridge.
c) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Deck Defense High Performance Roof Underlayment.
d) Secondary Underlayment Under Shingles:
(1) Weatherlock G Granulated Self-Sealing Ice & Water Barrier.
or
(2) Weatherlock Specialty Tile & Metal for High Temperature.
or
(3) Weatherlock Cold Climate for cold weather adhesion and flexibility.
e) Secondary Underlayment Under Shingles over Unheated Buildings:
(1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

2.2 ACCESSORIES

A. Elastomeric Roofing Sealant:
1. Design Criteria:
a. Meet requirements of ASTM D3019/D3019M.
b. Non-asphalt roofing cement (not permitted).
c. Elastomeric.
d. Cold temperature pliability.

e. Compatible with roof penetration boots.

2. Category Four Products And Manufacturers. See Section 01 6200 for definitions of Categories:
   a. Flintbond SBS Modified Bitumen Caulk by CertainTeed.

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

PART 3 - EXECUTION

3.1 INSTALLERS

a) Invited roofing contractors.

3.2 EXAMINATION

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

3.3 PREPARATION

A. Protection Of In-Place Conditions:

1. Install only as much roofing as can be made weathertight each day, including flashing and detail work.

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

3.4 INSTALLATION

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

B. Sequence of Roofing Materials as shown and noted on Contract Drawings:
   1. 12 inch strip Secondary Underlayment at Eave.
   2. Metal Drip Edge.
   3. General Secondary Underlayment.
   4. Valley Secondary Underlayment (8' - 6" (2.62 m) wide strip of Secondary Underlayment (3 strips) in Valleys applied over sheathing).
   5. Valley Secondary Underlayment (36 inch (915 mm) wide Primary Underlayment under Valley Metal).
   6. Valley Metal (24 inch (610 mm) wide valley metal 10 ft (3.05 m) lengths).
   7. 12 inch strip of Secondary Underlayment over nailed edges (of Valley Metal).
   8. General Primary Underlayment.
   9. Asphalt Shingles, Step Flashings.
   10. Counter Flashing.

C. Underlayment:
   1. General:
      a. Temporary Roof:
         1) Do not use permanent underlayment installation as temporary roof.
         2) If temporary roof is used, remove completely before installation of permanent underlayment.
      b. Follow Shingle Manufacturer's recommendations for installation of primary and secondary underlayment, particularly at eaves, rakes, and penetrations, unless specified installation procedures and Contract Drawing details are more stringent.
      c. Avoid scuffing underlayment that can compromise surface and cause leaking. If scuffing occurs, following Manufacturer's recommendation for repair.
      d. Staples are not permitted.
      e. Weather conditions:
         1) Do not leave underlayment exposed to weather more than thirty (30) days after beginning of underlayment installation even if Manufacture allows longer period of time.
         2) If underlayment is exposed for more than thirty (30) days after beginning of underlayment installation, treat as temporary roof under first paragraph above.
         3) If moisture is deposited on exposed underlayment, obtain written approval from Shingle Manufacturer's Representative before installing shingles.
      f. Install valley secondary underlayment, valley primary underlayment, and valley metal after installation of general secondary underlayment, but before installation of general primary underlayment.
   2. Primary Underlayment:
      a. Apply 48 inch (1 200 mm) wide courses over complete deck, including areas covered with secondary underlayment unless specified otherwise.
         1) Overlap underlayment before fastening.
         2) Maintain end laps of 6 inch (150 mm) and side laps of 3 inch (76 mm).

3) Stop primary underlayment between 3 and 6 inches (75 and 150 mm) of inside edge of strip of secondary underlayment installed over edge of formed valley metal.

b. Nailing Synthetic Underlayment:
   1) Use low-profile plastic or steel cap corrosion resistant nails with 1 inch (25 mm) diameter heads to fasten underlayment in place. (Fastening underlayment without caps is not permitted).
   2) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
   3) Fasteners should be long enough to penetrate at least 3/4 inch (19 mm) into roof sheathing. Fasteners must be lie flush to roof deck at 90 degree angle to roof deck and tight with underlayment.
   4) Do not nail through metal flashing, except drip edge, when installing primary underlayment.
   5) Follow Shingle Manufacturer's installation instructions for following:
      a) Securing underlayment to roof deck adjusting for roof slope nailing requirements.
      b) Side lap, end lap, and overlapping nailing requirements.
      c) Rake and eave nailing requirements.
      d) High wind condition nailing requirements.
      e) Sealants recommendations.

3. Secondary Underlayment:
   a. Under Shingles:
      1) Lap end joints 6 inches (150 mm) and side joints 3 inch (76 mm) minimum.
      2) Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes before installing drip edge.
      3) Apply two (2) 36 inch (900 mm) wide courses along eaves and rakes as described in Contract Documents with first course overlapping drip edge and 12 inches (300 mm) wide previously applied strip.

D. Shingles:
1. Before installing shingles, inspect underlayment and metal installation with Architect and Owner. Correct improperly installed and damaged material before beginning shingle installation.
2. Racking installation method is not permitted by Owner and will be considered non-conforming work.
3. Starter shingles:
   a. Manufacturer's starter shingles are required for Shingle Warranty.
   b. Install shingles at eve and rakes in accordance with Shingle Manufacturer's instructions.
   c. Cut shingles in accordance with Shingle Manufacturer's instructions, or use approved starter course.
   d. Nail to eave granule side up in continuous mastic bed with cut edge down-slope and edge overhanging eave 3/8 inch (9 mm) so sealing tabs are at edge of eave.
   e. Install shingles with maximum exposure recommended by Shingle Manufacturer.
   f. Lay first course directly over starter strip with ends flush with starter strip at eaves and so joints in starter strip are offset 4 inches (100 mm) minimum from joints in first course.
4. Lay shingles so end joints are offset in accordance with Shingle Manufacturer's installation procedures.
5. Insure alignment by snapping chalk line at least each fifth course to control horizontal and vertical alignment.
6. Run courses true to line with end joints properly placed. Leave shingles flat without wave and properly placed.
7. Hip and ridge shingles:
   a. Manufacturer's hip and ridge shingles are required for Shingle Warranty.
   b. Install specified hip and ridge shingles in accordance with Shingle Manufacturer's instructions.
   c. Run ridge shingles as directed by Architect.
8. Nailing:
   a. General:
      1) Six (6) Nail Pattern as recommended by Shingle Manufacturer for Shingle Warranty in each shingle.
      2) Place in relation to top edge of shingle as required by Shingle Manufacturer.

3) Place nails one inch (25 mm) from each end of shingle and remainder evenly spaced between.
4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.

b. Nailing guns:
1) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
2) Adjust nail gun pressure for nailing flush and tight to deck without cutting shingle surface.
3) Drive nails perpendicular to shingle surface so nail head is flat against shingle.
4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.

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

10. Over valley metal:
a. Do not drive nails through valley metal.
b. Run chalk line so valley metal will be exposed 6 inches (150 mm) wide at top and diverge 3/32 inch (one mm) per ft (300 mm) down to eaves.
c. Neatly trim shingles to this line.
d. Seal trimmed shingle edges to valley metal with continuous bead of elastomeric roofing sealant applied within one inch (25 mm) of shingle edge.

11. Vent pipe sleeve flange:
a. Vent pipe sleeve flange as specified in Section 07 6310.
b. Fit shingles under lower edge and over sides and upper edge.
c. Set vent pipe flange in elastomeric roofing sealant.
d. Embed shingles in elastomeric roofing sealant where they overlap flange.
e. Apply bead of elastomeric roofing sealant at junction of vent pipe and vent flashing.

12. Furnished and installed in Section 07 7226 'Ridge Vents'.

3.5 FIELD QUALITY CONTROL

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

3.6 CLEANING

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

B. Waste Management:
1. Disposal:
a. All work areas are to be kept clean, clear and free of debris always.
b. Do not allow trash, waste, or debris to collect on roof. These items shall be removed from roof daily.

c. Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

3.7 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 5419

POLYVINYL-CHLORIDE ROOFING: PVC

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install roofing membrane with flashings and other components to comprise total roofing system as described in Contract Documents including:
      a. Single-ply membrane.

B. Related Requirements:
   1. Section 06 0573.13: 'Preservative Wood Treatment' for roof related blocking and roof nailers.
   2. Section 06 0573.33: 'Fire-Retardant Wood Treatment' for roof related blocking and roof nailers.
   3. Section 06 2001: 'Common Finish Carpentry Requirements' for wood nailers, curbs and blocking.

C. Products Installed But Not Furnished Under This Section:
   1. Sheet metal work including caps, sleeves, umbrella hoods, pipe enclosures boxes, strapping, and scuppers.

D. Related Requirements:
   1. Division 07 for sheet metal work specialties and accessories.

1.2 REFERENCES

A. Association Publications:
   1. American National Standards Institute / Single Ply Roofing Industry:
      a. ANSI/SPRI/FM 4435/ES-1 2003, 'Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems'.
      b. ANSI/SPRI WD-1 'Wind Design Standard for Roofing Assemblies'.
   2. FM Global Resource Catalogue by FM Global, Norwood, MA www.fmglobal.com.
      a. Approval Guide:
         1) Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.
      b. Property Loss Prevention Data Sheet 1-28, 'Wind Design' (latest edition).
      c. Property Loss Prevention Data Sheet 1-29, 'Roof Deck Securement and Above-Deck Components' (latest edition).
      d. Property Loss Prevention Data Sheet 1-49, 'Perimeter Flashing' (latest edition).

B. Definitions:
   1. Flame Spread Classification: Categories as per ASTM E84/UL 723 or ULC 102:
      a. Class A: Highest fire-resistance rating for roofing as per ASTM E108. Indicated roofing is able to withstand severe exposure to fire exposure to fire originating from sources outside building.
      b. Class B: Fire-resistance rating indicating roofing materials are able to withstand moderate exposure to fire originating from sources outside of building.
      c. Class C: Fire-resistance rating indicating roofing materials are able to withstand light exposure to fire originating from sources outside of building.
      d. or Hawaii.

C. Reference Standards:
   1. ASTM International:
      a. ASTM C1289-18a, 'Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board'.

b. ASTM C1303/C1303M-15, 'Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation'.

2. Underwriters Laboratories (UL):
   a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
   b. UL 723, 'Tests for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
   c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
   d. UL 1897-04, 'Uplift Tests for Roof Covering Systems' (7th Edition).
   e. UL 2218, 'Standard for Impact Resistance of Prepared Roof Coverings Materials' (2nd Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in MANDATORY pre-installation conference.
      a. Roofing Installer's Foreman and those responsible for installation of roofing to be in attendance. Include Roofing Manufacturer's Representative if available.
   2. Schedule pre-installation conference at project site after installation of roof deck including pipe and flue penetrations, but before application of any roofing system component.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review Manufacturer's written instructions.
      b. Review if Project is in high wind area.
      c. Review delivery, storage, and handling requirements.
      d. Review ambient conditions requirements.
      e. Review roofing installation requirements including flashing and penetrations.
      f. Review roofing drainage requirements.
      g. Review temporary protections for roofing system.
      h. Review cleaning and disposal requirements.
      i. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
      j. Review safety issues.
      k. Review field inspections and non-conforming work requirements.
      l. Review protection of membrane by other trades after installation of membrane.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet for each element of system.
      b. Manufacturer's preparation and installation instructions and recommendations.
   2. Shop Drawings:
      a. Prepared by Roofing Installer and approved by Roofing Membrane Manufacturer and include following:
         1) Base flashings.
         2) Location and type of penetrations.
         3) Membrane terminations.
         4) Outline of roof and roof size.
         5) Perimeter and penetration details.
         6) Roof insulation:
            a) Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
            b) Taper insulation, including slopes.
         7) Special details and materials.
      b. Confirm that specified FM Class and UL Class assembly is appropriate for Project location.
      c. Include approved copy of Manufacturer's Notice of Award or Assembly Letter.
   3. Samples:
      a. Manufacturer's 4 inch (100 mm) square minimum sample representing actual color, membrane and thickness.

B. Informational Submittals:
   1. Certificates:
      a. Installer's signed certificate stating roofing system complies with Contract Documents performance requirements and work only performed by trained and authorized personnel in those procedures.
      b. Manufactures signed certificate that roof system has been inspected by Technical Service Representative and stating no deviation from system specified or approved shop drawings without written approval by Owner Representative and Manufacture.
   2. Test And Evaluation Reports: Submit evidence that roof system has been tested and approved or listed as follows:
      a. Submit evidence that roof system has been tested and approved or listed to meet Factory Mutual Research Corporation (FM) Classification required for this Project.
      b. Submit evidence that roof system has been tested to meet UL Class requirement required for fire-resistance rating for this Project.
   3. Special Procedure Submittals:
      a. Installer to fill out 'Roof Manufacturer' Installer Workmanship Warranty' and 'Manufacturer System Warranty' from information provided in the Attachment 'Roofing Manufacturer's Information For Architect' from Manufacturer and from Architect. Warranties are to be included in Closeout Submittals.
   4. Qualification Statement:
      a. Roofing Manufacturer's certification of Installer.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
         2) Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.
         3) Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.
      b. Record Documentation:
         1) Manufacturers Documentation:
            a) Record Shop Drawings if requested. Record shop drawings shall be given shop drawing number by Roofing Manufacturer.
            b) Certificate: Manufacturer Inspection report by Technical Service Representative.
            c) Certificate: Installer statement of compliance for performance requirements.
            d) Test And Evaluation Report: UL fire-resistance rating test report.
            e) Test And Evaluation Report: Factory Mutual Research Classification approval.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Requirements:
   1. Roof system will meet requirements of all federal, state, and local codes having jurisdiction (AHJ)
   2. Fire Characteristics Performance Requirement:
      a. Roof system will achieve UL Class A rating when tested in accordance with ASTM E108 or UL-790:
         1) Materials shall be identified with appropriate markings of applicable testing agency.
   3. Wind Criteria as per ASCE 7-10:
      a. Basic wind speed (V): 70
   4. Requirements of Section 01 4301 applies but not limited to the following:
      a. Installers Qualifications:
         1) Provide documentation if requested by Architect:
            a) Roofing Installer shall be approved and authorized by Roofing System Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's special warranty before bid.
            b) Roofing Installer shall be able to document roofing membrane installation for five (5) year minimum.

c) Roofing Installer must have current license for the city, county, and state where project is located.
d) Roofing Installer must have license for specific type of roofing work to be preformed.
e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
f) Membrane and flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.
g) Welding equipment shall be provided by or approved by Roofing Manufacturer. Mechanics intending to use equipment shall have successfully completed training course provided by Manufacturer's Technical Representative before welding.

b. Manufacturer Qualifications:
1) Manufacturer shall manufacture membrane material for five (5) consecutive years.
a) No product with documented failure will be allowed.
2) Manufacturer that is UL listed for membrane roofing system used for this Project.
3) Source Limitations:
a) Provide roof components including roof insulation and fasteners for roofing system from same Manufacturer as membrane roofing or approved by Roofing Membrane Manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Storage And Handling Requirements:
1. General:
a. Follow Manufacturer's instructions and precautions for storage of materials.
b. Handle and store roofing materials and place equipment in manner to avoid permanent deflection of roof decking.
c. Material Safety Data Sheets (MSDS) must be on location always during transportation, storage and application of materials.
2. Storage Requirements:
a. Protection:
1) Protect roof materials from physical damage, moisture, soiling, and other sources in a clean, dry, protected location and with temperature range required by Manufacturer. Protect from direct sunlight.
2) Provide continuous protection of materials against moisture absorption (Manufacturer's/Supplier's shrink wrap is not accepted waterproofing).
3) Store membrane rolls lying down on pallets fully protected from weather with clean canvas tarpaulins.
b. Roof Insulation:
1) Comply with insulation Manufacturer's written instructions for handling, storing, and protection during installation.
c. Safety:
1) Store flammable materials in cool, dry area away from sparks, open flames, or excessive heat. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
2) Liquid materials such as solvents and adhesives shall be stored off site and installed away from open flames, sparks, and excessive heat.
3) Site storage is acceptable if liquid materials are placed in a locked, sealed storage container.
4) Situate equipment and materials so as to preclude danger, disturbance, or interference to public safety and traffic, and to not constitute fire hazard.

d. Temperature:
   1) Store adhesives at temperatures above 40 deg F (4 deg C).and below 180 deg F (82 deg C).
e. Unacceptable Material:
   1) Remove from job site materials that are determined to be damaged by Architect or by Roofing Manufacturer and replace at no additional cost to Owner.
   2) Remove all wet and damaged materials from site.
   3) Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

3. Handling Requirements:
   a. Select and Handle operating equipment so as not to damage existing construction or new roofing system, or to overload structural system.
   b. Handle rolled goods so as to prevent damage to edge or ends.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Temperature ranges shall be within tolerances allowed for material being used.
      a. Roof surface shall be free of ponding water, ice, and snow.
      b. Cold temperature:
         1) Follow Manufacturer's written instructions for cold temperature requirements before applying membrane adhesive:
            a) Follow specified precautions.
            b) Expose only enough adhesive to be used as directed by membrane manufacturer.
            c) Low VOC restrictions (if required by local AHJ): Temperatures to be 40 deg F (4 deg C) and rising before applying.
      c. Hot temperature:
         1) Do not expose membrane and accessories to constant temperature in excess of 180 deg F (82 deg C).
   2. Proceed with roofing work when existing and forecasted weather conditions permit.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Roofing Membrane Manufacturer's Special Warranty for:
      a. Thirty (30) year no dollar limit (NDL) material and labor warranty covering roofing system, including insulation, components of membrane roofing system and flashing degradation and workmanship.
      b. Accidental Puncture Warranty:
         1) Membrane Manufacturer's written Accidental Puncture Warranty for up to sixteen (16) hours of Labor to repair punctures after final inspection.
      c. Warranty shall include wind speed coverage to 90 mph (145 kph).

B. Roof Installer Workmanship Warranty:
   1. Written five (5) year guarantee covering workmanship and repairs or replacement of work without cost to Owner, counter-signed by Installer and General Contractor from date of installation:
      a. Roof Installer Workmanship Warranty must include information required in Attachment 'Warranty Information'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturer:
   a. Sika Sarnafil, Canton, MA (800) 576-2358 or (781) 828-5400. www.sikacorp.com.
      1) Contact Information (USA, Canada and Global):

a) Primary Contact: Steve Moosman, District Manager, office (801) 575-8648 x7551 cell (801) 201-6269 moosman.steve@us.sika.com.
b) Secondary Contact: Jim Greenwell, Mountain Region Manager: office (801) 575-8648 x7558 cell (801) 455-3838 greenwell.jim@us.sika.com.

B. Design Criteria:
1. General:
a. Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.
b. Membrane roofing and base flashings shall remain watertight.
2. Drainage Requirement:
a. Roof system to provide positive drainage where all standing water dissipates within forty-eight (48) hours after precipitation ends.
3. Material Compatibility:
a. Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane Roofing Membrane Manufacturer based on testing and field experience.
4. Metal details, fabrication practices, and installation methods shall conform to applicable requirements of following:
a. Factory Mutual Loss Prevention Data Sheet 1-49, 'Perimeter Flashing' (latest issue).
b. Sheet Metal and Air Conditioning Contractors National Association Inc, 5th edition.

C. Components:
1. Membrane:
a. Description:

1) 'Mechanically Attached':
a) Meet requirements of ASTM D4434/D4434M, Type III:
b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Sika Sarnafil: S327 polyester reinforced membrane:
(a) Rhinobond attached system.

b. Thickness:
1) Field membrane: Thickness: 80 mil (2.03 mm) by optimum width and length determined by job conditions.
2) Flashing membrane: Thickness: 0.60 mil (1.52 mm) by optimum width and length determined by job conditions.

2. Insulation:
a. FM and UL approved.
b. If required by Manufacturer for warranty, provide approved facer.
c. Polyisocyanurate Foam Insulation Board:
1) Meet requirements of ASTM C1289.
2) Insulation boards shall be Factory Mutual approved for classification selected for project.
3) Facer:
a) Fiber reinforced paper facer or coated-glass fiber mat facer.
4) Insulation panels directly under roofing membrane and roof system cover board shall not exceed 48 inches by 96 inches (1 200 mm by 2 400 mm).
5) Insulation panels to be 2 inches (50 mm) maximum thickness for each layer. Insulation shall be multiple layers and achieve minimum 'R' value of 30. Tapered layer shall slope at 1/4 in per ft (20 mm per meter).
6) 'Mechanically Attached' application:
a) Minimum thickness to be determined by roofing system Manufacturer based upon Warranty term and Wind Warranty requirements.
b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) 1/2 inch (12.7 mm) thick minimum Dens-Deck Prime Roof Board by G-P Gypsum.

3. Vapor Retarder / Air Barrier:

a. Temporary Roof Membrane:
   1) Self adhered retarder:
   2) May be used as temporary roof membrane up to ninety (90) day exposure.
   3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) Sika Sarnafil:
         (1) Sarnavap air and vapor barrier with primers and sealants as required.

b. Wood Roof Decks:
   1) Self adhered retarder:
      a) May be used as temporary roof membrane up to ninety (90) day exposure.
      b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         (1) Sika Sarnafil:
            (a) Sarnavap air and vapor barrier with primers and sealants as required.

D. Adhesives, Sealants and Sealer:
1. General:
   a. Supplied by Roofing Membrane Manufacture Meet uplift and VOC requirements required for Project for specific application method and in compliance with all local codes and restrictions provided by Roofing Membrane Manufacture.
   b. As accepted by Roofing Manufacturer under specified warranty.
2. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.
3. Pourable Sealer:
   a. Approved by Roofing Membrane Manufacturer for specified roof system.
4. Membrane:
5. Insulation:
   a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) .
      2) Sika Sarnafil:
         a) Sarnacol 2163/AD/OM: Low rise polyurethane foam adhesive.

E. Coated Metal:
1. Colors:
   a. Not Seen From Ground: Color to match selected roof membrane.
   b. Seen From Ground: Manufacturer's standard color as selected by Architect to match membrane surface color chosen for project. All areas seen from the ground shal be the mfgrs. Brown membrane to match as closely as possible the shingle color.
2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   a. Sika Sarnafil:
      1) 25 ga (0.56 mm) G90 galvanized sheet metal laminated with 0.020 inch (0.55 mm) thick membrane:
      2) Sarnclad membrane cover strips:
         a) 0.060 inch (1.5 mm) thick.
         b) Color to match selected Sarnaclad.

F. Counterflashing:
1. Formed to meet design requirements and match existing metals and aesthetics, furnished by Membrane Manufacturer.

G. Mechanical Attachment Accessories:
1. Fasteners:
   a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
2. Bars And Plates:
   a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Sika Sarnafil:
         a) Bars and plates engineered as companion assembly with Sarnafasteners. Used to secure membrane and/or flashing as required by Membrane Manufacturer.
      2) Sika Sarnafil:
         a) Plates engineered as companion assembly with Sarnafasteners.

b) Used to secure insulation, hardboard, and membrane as required by Membrane Manufacturer.

H. Miscellaneous Fasteners and Anchors:
1. Fasteners, anchors, nails, straps, bars, etc. shall be of post-galvanized zinc or cadmium-plated steel, aluminum, or stainless steel. Mixing metal types and methods of contact shall be in such manner as to avoid galvanic corrosion.
2. Compatible with substrates and flashings to be anchored:
   a. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins.
   b. Wood fasteners and anchors shall have embedment of one inch (25 mm) minimum and be approved for such use by Fastener Manufacturer.

I. Prefabricated Flashing Accessories: Membrane corners and pipe stacks as supplied by Membrane manufacturer.

J. Wood Nailers:
1. Treat wood nailers as per Section 06 0573.13 for preservative wood treatment and Section 06 0573.33 for fire-retardant wood treatment. Creosote or asphaltic-treated wood is not acceptable.
2. Wood nailers shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
3. Wood shall have maximum moisture content of 19 percent by weight on dry weight basis.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Category Three Approved Manufacturer's Roofing Installers: See Section 01 4301:

3.2 EXAMINATION

A. Verification Of Conditions (for reroofing over existing building):
1. Examine substrate and conditions. Verify substrate is suitable for installation of roofing system membrane before starting work of this Section.
2. Verify that roof drain lines are functioning correctly before starting work of this Section:
   a. Report such blockages in writing to Owner's representative, with copy to Roofing Membrane Manufacturer, for corrective action before beginning work of this Section.
3. Inspect for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect quality of work.
4. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation to be installed.
5. Remove existing roofing, base flashing, deteriorated wood blocking and metal flashing:
   a. Remove only that amount of existing roofing and flashing that can be made watertight with new materials during a one-day period or onset of inclement weather.
6. Notify Architect of unsuitable conditions in writing:
   a. Commencement of Work by installer is considered acceptance of substrate.
   b. Stop work immediately if any unusual or concealed condition is discovered and immediately notify Architect in writing, with letter copy to Roofing Manufacturer.
   c. Proceed with installation only after unsatisfactory conditions have been corrected.
7. Remove and discard temporary seals before beginning work on adjoining roofing.

B. Surface Preparation:
1. Surfaces to receive new materials shall be clean, smooth, dry (free of moisture), free of flaws, sharp edges, loose and foreign material, dirt, oil and grease.
   a. Mechanically scrape exposed surfaces, if necessary, to remove projections.
2. Verify that surfaces receiving new materials have no defects or errors that would result in poor application or cause latent defects in workmanship.
   a. Roofing shall not start until defects have been corrected.

3. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by elements on continuous basis.
4. Provide temporary walkways and work platforms as necessary to complete work under this section with no damage to surfaces exposed during work.
5. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
6. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.
7. Reset or replace existing fasteners that are loose, deformed, damaged, or corroded.
8. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 PREPARATION

A. Removal of Existing Roofing:
   1. Remove existing single ply roofing membrane to deck. Provide temporary membrane to ensure building is water tight. Remove existing shingles, felts, etc. to wood deck.

B. General Requirements:
   1. Remove existing roofing, base flashing, deteriorated wood blocking and metal flashings. Recycle materials that can be recycled.
   2. Remove only that amount of existing roofing and flashing that can be made watertight with new materials during a one-day period or onset of inclement weather.
   3. Inspect for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect quality of work.
      a. Wood Deck:
         1) Ensure decking is sound and able to provide support and attachment of new roofing assembly.
         2) Deteriorated or unsound decking that can not comply with this requirement shall be brought to attention of Project Manager.
         3) As directed by Project Manager, remove and replace sections of decking with like materials and in compliance with local code requirements.
   4. Nailers:
      a. Install continuous treated wood nailers at perimeter of entire roof and around roof projections and penetrations as described on Project Drawings. Replace existing wood nailers shown to remain, if they contain rot or are otherwise damaged.
         1) Anchor nailers to resist minimum force of 300 lbs (136 kg) per lineal foot (300 mm) in any direction:
            a) Provide 1/2 inch (13 mm) space between nailer lengths.
            b) Individual nailer lengths shall not be less than 36 inches (900 mm) long.
            c) Nailer fastener spacing shall be at 12 inches (300 mm) on center, or 16 inches (400 mm) if necessary, to match structural framing.
            d) Stagger fasteners 1/3 nailer width and install within 6 inches (150 mm) of each end.
            e) Meet requirements current Factory Mutual Loss Prevention Data Sheet 1-49.
         2) Thickness shall match substrate or insulation/hardboard height.
         3) Anchor existing woodwork that is to remain so as to resist minimum force of 300 lbs (136 kg) per lineal foot (300 mm) in any direction. Reuse only woodwork designated to be reused in detail drawings.
   5. Prevent interior leakage, materials falling into interior, and other such Occurrences.
   6. Install temporary roof membrane (Sarnavap SA as called out in Part 2 of this specification section) to prevent interior leakage and soiling/staining of new roof membrane. Temporary roofing can remain exposed for maximum of 90 days.
   7. Install temporary water cut-offs at completion of each day's work and completely remove upon resumption of work.
      a. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with finished roof as installation progresses.
      b. Replace contaminated membrane at no additional cost to Owner.

8. Provide temporary walkways and work platforms as necessary to complete work under this section with no damage to existing surfaces, surfaces exposed during work, and to new materials applied.
9. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
10. Sheet metal sleeves, caps, and enclosures shall be completely installed on daily basis.

C. Surface Preparation:
1. Surfaces to receive new materials shall be clean, smooth, dry (free of moisture), free of flaws, sharp edges, loose and foreign material, dirt, oil and grease.
   a. Mechanically scrape exposed surfaces, if necessary, to remove projections.
   b. Roofing shall not start until defects have been corrected.
2. Verify that surfaces receiving new materials have no defects or errors which would result in poor application or cause latent defects in workmanship.
3. Inspect anchoring of wood members for conformance to specified requirements. Upgrade nonconforming fasteners to meet specified requirements.
4. Reset or replace fasteners that are loose, deformed, damaged, or corroded.
5. Fit joints of insulation tightly together.
6. Prevent interior leakage, materials falling into interior, and other such Occurrences.
7. Install temporary water cut-offs at completion of each day's work and completely remove upon resumption of work.
   a. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with finished roof as installation progresses.
   b. Replace contaminated membrane at no additional cost to Owner.
8. Provide temporary walkways and work platforms as necessary to complete work under this section with no damage to existing surfaces exposed during work, and to new materials applied.
9. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
10. Sheet metal sleeves, caps, and enclosures shall be completely installed on daily basis.
11. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
12. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.
13. Remove and discard temporary seals before beginning work on adjoining roofing.

D. General:
1. Installation shall be in conformance with latest edition of manufacturer's specification except where Contract Documents are more restrictive.
2. Roof surfaces shall be free of water, ice and snow. Surfaces to receive new insulation, membrane, or flashings shall be dry. Should surface moisture occur, provide equipment necessary to dry surface before application.
3. Secure new and temporary construction, including equipment and accessories, so as to preclude wind blow-off and subsequent roof or equipment damage.
4. Install only as much roofing as can be made weathertight each day, including flashing and detail work. Clean seams and heat-weld before leaving jobsite.
5. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.
6. Install uninterrupted waterstops at end of each day's work and completely remove before proceeding with next day's work:
   a. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with finished roof as installation progresses.
   b. Replace contaminated membrane at no additional cost to Owner.
7. Avoid use of newly constructed roofing as walking surface or for equipment movement and storage:
   a. Where such access is required, provide necessary protection and barriers to segregate work area and to prevent damage to adjacent areas.
   b. Provide protection layer consisting of roof sheathing over insulation board and roofing membrane for new and existing roof areas which receive rooftop traffic during construction.

8. Before and during application, remove dirt, debris, and dust from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.
9. Report rooftop contamination that is anticipated or that is occurring to Roofing Manufacturer to determine corrective steps to be taken.
10. Wood Roof Decks:
    a. Self adhered retarder: Apply self adhesive retarder directly over deck with overlaps and sheet edges sealed in accordance with Manufacturer's instruction.

E. Insulation:
1. Neatly cut insulation cut to fit around penetrations and projections.
2. Install tapered insulation in accordance with insulation manufacturer's shop drawings.
3. Install tapered insulation around drains creating a drain sump.
4. Do not install more insulation board than can be covered with roofing membrane by end of day's work or onset of inclement weather.
5. 'Mechanically Attached' Attachment:
    a. Fasten to deck with approved fasteners and plates in accordance with Insulation Manufacturer, Factory Mutual, and Roofing Manufacturer recommendations for fastening rates and patterns.
    b. Quantity and locations of fasteners and plates shall also result in insulation boards resting evenly on roof deck/substrate so there are no large cavities or air spaces between boards and substrate.
    c. Install fasteners in accordance with fastener manufacturer's recommendations:
        1) Fasteners are to have minimum penetration into structural deck as recommended by Fastener Manufacturer and Roofing Manufacturer.

F. Roof System Cover Board:
1. Offset roof system cover board joints 24 inches (600 mm) minimum from joints in underlying substrate or insulation.
2. Wood Roof Decks:
    a. Non-visible installation:
        1) Secure roof system cover board using insulation plates and fasteners spaced as required by Membrane Manufacturer's warranty requirements.
    b. Visible (from ground/surrounding buildings) installation.
        1) Secure roof system cover board using low profile attachment plates and fasteners spaced as required by Membrane Manufacturer's warranty requirements.
    c. Rhinobond roof assembly attachment plates and fasteners.
        1) Secure roof system cover board using insulation plates and fasteners spaced as required by Membrane Manufacturer's warranty requirements.

G. Membrane:
1. Inspection:
    a. Inspect surface of insulation or substrate before installation of roof membrane.
    b. Substrate shall be clean, dry and smooth with no excessive surface roughness, contaminated surfaces or unsound surfaces such as broken, delaminated, or damaged insulation boards.
    c. All sharp projections shall be removed by sweeping, blowing or vacuum cleaning.
2. 'Mechanically Attached':
    a. In Seam Option:
        1) Unroll and position membrane without stretching. Provide and secure both perimeter and field membrane sheets in accordance with manufacturer's most current specifications and details.
        2) over pre-printed marks approximately 1-1/2 inches (38 mm) from edge of membrane sheet).
    b. Rhinobond Option:
        1) Preparation: Using test strip of membrane and loose Rhinobond plates, provide at least four (4) varied heat settings to calibrate Rhinobond welder for operation during each work period.
        2) Roll out and set membrane. Follow Manufacturer's written instructions:
            a) Provide 3 inches (75 mm) shingled lap seaming area in all membrane overlaps.

b) Weld random perimeter Rhinobond plates to secure field membrane from shifting during seam and field welds.
c) Identify remaining Rhinobond plates and weld membrane using repeated leap frog method of welding followed by placement of cooling magnets.

3. Hot-Air Welding Of Lap Areas:
   a. General:
      1) Seams shall be hot air welded. Seam overlaps shall be 3 inches (75 mm) wide minimum when automatic machine welding, and 4 inches (100 mm) wide when hand welding.
      2) Membrane to be welded shall be clean and dry. No adhesive shall be in seam.
      3) Hand Welding:
         a) Hand welded seams shall be completed in three stages. Allow hot-air welding equipment to warm up for one (1) minute minimum before welding.
      4) Seam shall be tack-welded every 36 inches (900 mm) to hold membrane in place.
      5) Weld back edge of seam with narrow but continuous weld to prevent loss of hot air during final welding.
      6) Insert nozzle into seam at 45 degree angle. Once proper welding temperature has been reached and membrane begins to 'flow', position hand roller perpendicular to nozzle and press lightly. For straight seams, use 1-1/2 inch (38 mm) wide nozzle. Use 3/4 inch (19 mm) wide nozzle for corners and compound connections.
   b. Machine Welding: Follow Roofing Manufacturer's instructions and use recommended equipment.
   c. Quality Control of Welded Seams:
      1) Check welded seams for continuity using rounded screwdriver. Make on-site evaluation of welded seams daily at locations directed by Owner's Representative or representative of Roofing Manufacturer.
      2) Take one inch (25 mm) wide cross-section samples of welded seams at least three times a day. Patch each test cut at no additional cost to Owner.

H. Flashings:
   1. General:
      a. Install flashings concurrently with roof membrane. No temporary flashings will be allowed without prior written approval of Owner's Representative and Roofing Manufacturer. Approval shall only be for specific locations on specific dates.
      b. If water is allowed to enter under newly completed roofing, remove and replace affected area no additional cost to Owner.
      c. Adhere flashings to compatible, dry, smooth, and solvent-resistant surfaces.
   2. Membrane Flashings:
      a. Adhesive Application for Flashings:
         1) Adhere flashing membranes to solvent resistant substrates. Cut interior and exterior corners and miters and hot-air weld into place. No bitumen shall be in contact with membrane.
         2) Apply adhesive using solvent-resistant 3/4 inch (19 mm) nap paint rollers. Apply adhesive in smooth, even coatings with no holidays, globs, or similar irregularities. Coat only area that can be completely covered in same day's operations. Allow surface with adhesive coating to dry completely prior to installing flashing membrane.
         3) When surface is dry, cut flashing membrane to workable length and evenly coat underside with adhesive apply at Manufacturer's adhesive coverage rate requirements.
         4) When adhesive has dried sufficiently to produce strings when touched with a dry finger, roll coated membrane onto previously coated substrate being careful to avoid wrinkles. Do not allow adhesive on underside of membrane to completely dry. Overlap adjacent sheets 3 inches (75 mm). Flashings shall extend 4 inches (100 mm) onto roofing membrane. Press bonded sheet firmly in place with hand roller.
         5) Apply no adhesive in seam areas that are to be welded.
      b. Install fasteners and membrane fastenings plates at 12 inches (300 mm) on center with acceptable fasteners into structural deck at the base of parapets, walls, and curbs. Also install Sarnastop at the base of tapered edge strips and at transitions, peaks, and valleys according to Roofing Manufacturer's details:
         1) Hurricane Bar:

a) Provide inside 4 ft (1.20 m) perimeter peel stop (Hurricane Bar) required by Owner for all projects in all wind speed coverage areas.

c. Extend flashings 8 inches (200 mm) minimum above roofing level unless otherwise accepted in writing by Owner's representative and Roofing Manufacturer.
d. Terminate flashings according to Roofing Manufacturer's recommended details.
e. Mechanically fasten flashing membranes along top edge through tin discs or pre-drilled, galvanized metal strip washers spaced at of 12 inches (300 mm) maximum on center.

3. Metal Flashings:
   a. Complete metal work in conjunction with roofing and flashings so that watertight condition exists daily.
   b. Install metal to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
   c. Metal joints shall be watertight.
   d. Securely fasten metal flashings into solid wood blocking. Fasteners shall penetrate wood nailer one inch (25 mm) minimum.
   e. Airtight and continuous metal hook strips are required behind metal fascias. Fasten hook strips 12 inches (300 mm) on center into wood nailer or masonry wall.
   f. Counterflashings shall overlap base flashings 4 inches (100 mm) minimum.
   g. Metal Base Flashings:
      1) Space adjacent sheets 1/4 inch (6 mm) apart.
      2) Fasten ends of metal 6 inches (150 mm) on center.
      3) Cover joint with 2 inch (50 mm) wide aluminum tape.
      4) Hot-air weld 4 inch (100 mm) wide strip of flashing membrane over joint.
   h. Metal Edge Flashing:
      1) Install as per requirements of ANSI/SPRI/FM 4435/ES-1, 'Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems'.
      2) Fasten metal edge flashings with two rows of post-galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered.
      3) Space adjacent sheets of metal 1/4 inch (6 mm) apart.
      4) Cover joint with 2 inch (50 mm) wide aluminum tape.
      5) Sika Sarnafil Sarnaclad:
         a) Hot-air weld 4 inch (100 mm) wide strip of flashing membrane over joint.

I. Temporary Cut-Off:
   1. Construct temporary waterstops to provide one hundred (100) percent watertight seal:
      a. Make stagger of insulation joints even by installing partial panels of insulation.
      b. Carry new membrane into waterstop.
      c. Seal waterstop to deck or substrate so water will not travel under new or existing roofing.
      d. Seal edge of membrane in continuous heavy application of sealant as described above.
      e. When work resumes, cut-out contaminated membrane and dispose of off-site.
   2. If inclement weather occurs while temporary waterstop is in place, provide labor necessary to monitor situation to maintain watertight condition.
   3. If water is allowed to enter under newly completed roofing, remove affected area and replace at no additional cost to Owner.

3.4 FIELD QUALITY CONTROL

A. Field Inspection:
   1. Before Manufacturer's inspection for warranty, Installer must perform pre-inspection to review work and to verify flashing has been completed as well as application of caulking.
   2. Architect to inspect roof under Steeple to certify that debris removed, and roofing system has been installed in compliance with Contract Document requirements.
   3. Final Roof Inspection:
      a. Arrange for Roofing Membrane Manufacturer's technical personnel to inspect roofing installation on completion.
   4. Upon completion of roof inspection, provide certification that installation has been performed in accordance with Contract Document and Roofing Manufacturer requirements.

B. Non-Conforming Work:

1. Correct all work not in compliance to Contract Documents at no additional cost to Owner.
   a. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
   b. Replace contaminated membrane.
2. Additional inspections will be performed to determine compliance of replaced or additional work with specified requirements at no additional cost to Owner.
3. Repair landscaped areas damaged by construction activities at no additional cost to Owner.

3.5 CLEANING

A. Waste Management:
   1. Perform daily clean-up to collect wrappings, empty container, paper, and other roofing waste debris from project site.
   2. Upon completion, roofing waste materials must be disposed from site to dumping area legally authorized to receive such materials.
   3. Complete site cleanup, including both interior and exterior building areas that have been affected by construction, to Owner's satisfaction.

3.6 PROTECTION

A. General Contractor Responsibility:
   1. Protection of roofing membrane from damage and wear from other trades from damage after completion of roof membrane.
   2. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by Manufacturer of affected construction.

END OF SECTION

SECTION 07 6210

GALVANIZED STEEL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

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

B. Products Furnished But Not Installed Under This Section:
   1. Gravel stops, copings, scuppers, and miscellaneous sheet metal specialties not specified to be of other materials.

C. Related Requirements:
   1. Sections under 07 3000 heading: 'Steep Slope Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
   2. Sections under 07 5000 heading: 'Membrane Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
   3. Section 07 9213: 'Elastomeric Joint Sealant'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
   2. Federal Specifications:
      a. TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

PART 2 - PRODUCTS

2.1 SYSTEM

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

B. Materials:
   1. Sheet Metal:

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

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

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

2.2 ACCESSORIES

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

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

C. Roof Diverter:
   1. Roof Diverter (Kickout Diverter) required when vertical wall extends beyond lower roof.
      a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
      b. Size: 6 inch (150 mm) x 6 inch (150 mm) by 12 inches (300 mm) length.

D. Step Flashing:
   1. Step flashing required for steep slope for roof to wall flashing.
      a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
      b. Size: 5 inch (125 mm) x 5 inch (125 mm) by 8 inch (200 mm) or 12 inches (300 mm) length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install with small, watertight seams.

B. Slope to provide positive drainage.

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

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

E. Allow sufficient tolerance for expansion and contraction.

F. Insulate work to prevent electrolytic action.

3.2 CLEANING

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

END OF SECTION

SECTION 07 6310

STEEP SLOPE ROOF FLASHING: Asphalt Shingles

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:
   1. Section 07 3113: 'Asphalt Shingles' for installation.
   2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants.
   3. Division 22: Plumbing vent piping.
   4. Division 23: HVAC flues and air piping.

1.2 REFERENCES

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

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
   2. ASTM International: (specifically referenced for pipe flashing only):
      a. ASTM B117-18, 'Standard Practice for Operating Salt Spray (Fog) Apparatus'.

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

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Pipe Flashing:

1.5 WARRANTY

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

B. Formed Valley Metal And Drip Edge:
1. Metal:

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

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

D. Finishes:
1. Face coating polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500 or Hylar 5000) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
2. Reverse side coating of steel flashings to be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
3. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Pipe Flashing For Plumbing Vent Lines metal flues, and HVAC Air Piping:
1. Description:
a. Ultra-pure high consistency molded one hundred (100) percent silicone rubber pipe boot that prevents cracking and splitting for life of roof.
2. Design Criteria:
a. Meet following Tests:
1) ASTM B117 (Salt Spray Test).
2) ASTM E283 (Air Leakage).
3) ASTM E 330 (Uniform Structural Load).
4) ASTM E331 (Water Penetration).
5) ASTM E2140 (Water).

B. Roof Jacks For Metal Flues: Factory-made galvanized steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
1. Coordinate with pipe installers for proper size of roof jacks and pipe flashing.

B. Pipe Flashing:
1. Follow Manufacturer's installation instructions.

C. Pipe Flashing For Concentric Piping Flashing Retrofitting:
1. Follow Manufacturer's installation instructions including but not limited to:
a. Choose appropriate retrofit size.
b. Wrap pipe flashing around pipe.
c. Apply 100 percent silicone sealant between base, roof, and top of flashing.
d. Use fasteners provided.
e. Apply cable tie as directed.

END OF SECTION

SECTION 07 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. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
   2. .

1.2 REFERENCES

A. Definitions:
   1. Sealant Types and Classifications:
      a. ASTM Specifications:
         1) Type:
            a) Type S: Single-component sealant.
         2) Grade:
            a) 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) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
            b) 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 C1330-18, '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.

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 Building Elements:
    a. Description:
        1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
            a) Other joints necessary to seal off building from outside air and moisture.
    b. Design Criteria:
        1) Meet following standards for Sealant:
            a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
        2) Limitations:
            a) Do not use below-grade applications.
            b) Do not use on surfaces that are continuously immersed or in contact with water.
            c) Do not use on wet, damp, frozen or contaminated surfaces.
            d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
        3) Color:
            a) Architect to select from Manufacturer's standard colors.
            b) Match building elements instead of window (do not use white that shows dirt easily).
    c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        1) Dow Corning:
            a) Primer: 1200 Prime Coat.
            b) Sealant: 791 Silicone Weatherproofing Sealant.
        2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
            a) Primer: SS4044 Primer.
            b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
        3) Tremco:
            a) Primer:
                (1) Metal surface: No. 20 primer.
                (2) Porous surfaces: No. 23 primer.
            b) Sealant: Spectrum 1 Silicone Sealant.

3. Sealants At Exterior Sheet Metal And Miscellaneous:
    a. Description:
        1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
            a) Flashings.
            b) Gutters.
            c) Penetrations in soffits and fascias.
            d) Roof vents and flues.
            e) Lightning protection components.
    b. Design Criteria:
        1) Meet following standards for Sealant:
            a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
        2) Limitations:
            a) Do not use below-grade applications.
            b) Do not use on surfaces that are continuously immersed or in contact with water.
            c) Do not use on wet, damp. frozen or contaminated surfaces.

d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.

c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   1) Dow Corning: 790 Silicone Building Sealant.
   2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
   3) Tremco: Tremsil 600 Silicone Sealant.

2.2 ACCESSORIES

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

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Surface Preparation:
   1. Remove existing joint sealant materials where specified.
      a. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface using manufacturer's recommended joint preparation methods.
      b. Repair deteriorated or damaged substrates as recommended by Sealant Manufacturer to provide suitable substrate. Allow patching materials to cure.
   2. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:

a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
d. Primers:
1) Primers enhance adhesion ability.
2) Use of primers is not a substitution for poor joint preparation.
3) Primers should be used always in horizontal application where there is ponding water.

3. Field test joints in inconspicuous location.
a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
4. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

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

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

3.3 APPLICATION

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

3.4 TOLERANCES

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

3.5 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 23: HEATING, VENTILATING, AND AIR-CONDITIONING

END OF TABLE OF CONTENTS

SECTION 23 0501

COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common requirements and procedures for HVAC systems.
   2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
   3. Interface with Testing And Balancing Agency.

B. Related Requirements:
   1. Division 26: Raceway and conduit, unless specified otherwise, line voltage wiring, outlets, and disconnect switches.
   2. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's catalog data for each manufactured item.
         1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
         2) Include name, address, and phone number of each supplier.
   2. Shop Drawings:
      a. Schematic control diagrams for each separate fan system, heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
      b. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays. Include drawings showing electrical power requirements and connection locations.
      c. Drawing of each temperature control panel identifying components in panels and their function.
      d. Other shop drawings required by Division 23 trade Sections.

B. Informational Submittals:
   1. Sustainable Design Submittals:
      a. See Section 01 8113 for Sustainable Design Requirements for this Project. See individual Specification Sections in Division 23 for Submittals required.

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 HVAC section of Operations And Maintenance Manual, provide master index showing items included.
   a) Provide name, address, and phone number of Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
   b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
      (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
      (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
      (3) Summary list of mechanical equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.
   c) Provide operating instructions to include:
   (1) General description of each HVAC system.
   (2) Step by step procedure to follow in putting each piece of HVAC equipment into operation.
      (3) Provide diagrams for electrical control system showing wiring of items such as smoke detectors, fuses, interlocks, electrical switches, and relays.

b. Warranty Documentation:
   1) Include copies of warranties required in individual Sections of Division 23.

c. Record Documentation:
   1) Manufacturers documentation:
      a) Copies of approved shop drawings.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Perform work in accordance with applicable provisions of Gas Ordinances applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
   2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Engineer in writing of such differences before performing work affected by such differences.
   3. Sustainable Design Compliance:
      a. Submit all Sustainable Design Requirements to comply with Section 01 8113 for information needed by the Design Professional to demonstrate that particular credits have been achieved. In particular, credits that depend on knowing the cost and quantity of certain types of products cannot be achieved without obtaining that information from the Contractor. These include renewable content, locally sourced new products, and reused products. In addition, a form is provided for each installer to certify that they have not used adhesives, sealants, and for suppliers and installers to certify they have not used composite wood with prohibited VOC content.

B. Identification:
   1. 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.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Accept valves on site in shipping containers with labeling in place.

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

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.

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

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

B. Pipe And Pipe Fittings:
   1. Use domestic made pipe and pipe fittings on Project.
   2. Weld-O-Let and Screw-O-Let fittings are acceptable.

C. Sleeves:
   1. In Framing: Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal two sizes larger than bare pipe or insulation on insulated pipe.
   2. In Concrete And Masonry: Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.

D. Valves:
   1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Drawings:
   1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.

2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

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

3.2 PREPARATION

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

3.3 INSTALLATION

A. Interface With Other Work:
1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
3. Testing And Balancing:
   a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
   b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:
   1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
   2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
   3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
   4. Determine exact route and location of each pipe and duct before fabrication.
      a. Right-Of-Way:
         1) Lines that pitch shall have right-of-way over those that do not pitch. For example, steam, steam condensate, and drains shall normally have right-of-way.
         2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
      b. Offsets, Transitions, and Changes in Direction:
         1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
         2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Piping:
   1. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus.
      a. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.
      b. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings.
         1) Arrange so as to facilitate removal of tube bundles.
         2) Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
            a) Make connections of dissimilar metals with di-electric unions.
            b) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
         3) Do not use reducing bushings, street elbows, bull head tees, close nipples, or running couplings.
         4) Install piping systems so they may be easily drained. Provide drain valves at low points and manual air vents at high points in hot water heating and cooling water piping.
         5) Install piping to insure noiseless circulation.
         6) Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
      c. Do not install piping in shear walls.
   2. Properly make adequate provisions for expansion, contraction, slope, and anchorage.
      a. Cut piping accurately for fabrication to measurements established at site. Remove burr and cutting slag from pipes.
      b. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
      c. Make changes in direction with proper fittings.
      d. Expansion of Thermoplastic Pipe:
         1) Provide for expansion in every 30 feet (9 meters) of straight run.
         2) Provide 12 inch (300 mm) offset below roof line in each vent line penetrating roof.

3. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade. Seal sleeves with specified sealants.
   a. Sleeves through floors shall extend 1/4 inch (6 mm) above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
   b. Sleeves through floors and foundation walls shall be watertight.
4. Provide spring clamp plates (escutcheons) where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.
5. Remove dirt, grease, and other foreign matter from each length of piping before installation.
   a. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
   b. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
   c. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

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

F. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.
2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.4 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.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
1 Perform tests on HVAC piping systems. Furnish devices required for testing purposes.

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

3.6 SYSTEM START-UP

A. Off-Season Start-up:
1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
2. Notify Owner seven days minimum before scheduled start-up.
3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.

4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

B. Preparations that are to be completed before start up and operation include, but are not limited to, following:
   1. Dry out electric motors and other equipment to develop and properly maintain constant insulation resistance.
   2. Make adjustments to insure that:
      a. Equipment alignments and clearances are adjusted to allowable tolerances.
      b. Nuts and bolts and other types of anchors and fasteners are properly and securely fastened.
      c. Packed, gasketed, and other types of joints are properly made up and are tight and free from leakage.
      d. Miscellaneous alignings, tightenings, and adjustings are completed so systems are tight and free from leakage and equipment performs as intended.
   3. Motors and accessories are completely operable.
   4. Inspect and test electrical circuitry, connections, and voltages to be properly connected and free from shorts.
   5. Adjust drives for proper alignment and tension.
   6. Make certain filters in equipment for moving air are new and of specified type.
   7. Properly lubricate and run-in bearings in accordance with Manufacturer's directions and recommendations.

3.7 CLEANING

A. Clean exposed piping, ductwork, and equipment.

B. No more than one week before Final Inspection, flush out bearings and clean other lubricated surfaces with flushing oil. Provide best quality and grade of lubricant specified by Equipment Manufacturer.

C. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.8 CLOSEOUT ACTIVITIES

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

3.9 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.

B. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

C. After start-up, continue necessary lubrication and be responsible for damage to bearings while equipment is being operated up to Substantial Completion.

END OF SECTION

SECTION 23 0502

DEMOLITION AND REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

A. Under this section remove obsolete piping and mechanical equipment and relocate, reconnect or replace existing piping affected by demolition or new construction. Remove concealed piping abandoned due to demolition or new construction, or cap piping flush with existing surfaces.

1.3 DRAWINGS AND EXISTING CONDITIONS

A. All relocations, reconnections and removals are not necessarily indicated on the drawings. As such, the Contractor shall make adequate allowance in his proposal for this work as no extra charges will be allowed for these items.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.1 TEMPORARY CONNECTIONS

A. Where existing piping must remain in service to supply occupied areas during construction, provide temporary piping, connections, and equipment to maintain service to such areas. All shall be performed in a neat and safe manner to prevent injury to the building or its occupants.

3.2 DRILLING, CUTTING, PATCHING

A. All Required drilling, cutting, block-outs and demolition work required for the removal and/or installation of the mechanical system is the responsibility of this Contractor.

B. No joists, beams, girders, trusses or columns shall be cut by any Contractor without written permission from the Engineer.

C. The patching, repair, and finishing to existing or new surfaces is the responsibility of this Contractor, unless specifically called for under sections of specifications covering these materials.

D. Disconnect all equipment that is to be removed or relocated. Relocate any existing equipment that obstructs new construction.

3.3 EXISTING PIPING TO REMAIN IN USE

A. Where affected by demolition or new construction, relocate, replace, extend, or repair piping and equipment to allow continued use of same. Use methods and materials as specified for new construction.

3.4 MATERIALS AND EQUIPMENT REMOVED

A. All obsolete materials, piping, and equipment shall become the property of the Contractor and be removed from the site promptly.

END OF SECTION

SECTION 23 0553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SUBMITTALS

A. Informational Submittals:
   1. Sustainable Design Submittals:
      a. Product Data for Credit EQ 4.1:
         1) For adhesives, including printed statement of VOC content.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. General:
   1. VOC Content of Field-Applied Interior Paints and Coatings:
      a. Provide products that comply with the limits for VOC content and the limits for chemical components specified under heading Sections 09 9000 portions of the specifications.

B. Materials:
   1. Labels:
      a. Equipment Identification:
         1) Black formica, with white reveal when engraved.
         2) Lettering to be 3/16 inch (5 mm) high minimum.

PART 3 - EXECUTION

3.1 APPLICATION

A. Labels:
   1. Identify following items with specified labels fastened to equipment with screws (unless noted otherwise):
      a. A/C Condensing units.
      b. Furnaces

END OF SECTION

SECTION 23 0593

DUCT TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Test, balance, and adjust air duct systems as described in Contract Documents.

B. Related Sections:
   1. Other Sections of Division 23:
      a. Completing installation and start-up of mechanical systems, and changing sheaves, belts, and dampers as required for correct balance.
      b. Assisting Balancing Agency in testing and balancing of mechanical system.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Perform testing and balancing in complete accordance with Associated Air Balance Council Standards for Field Measurement & Instructions, Form P1266, Volume I. Record test data on AABC standard forms or facsimile.
   2. Noise level shall not exceed PNC 35 in Chapel or Cultural Center when all mechanical equipment is operating.

1.3 SUBMITTALS

A. Quality Assurance / Control:
   1. Four copies of complete test data for evaluation and approval.
   2. Test And Balance Report:
      a. Complete with logs, data, and records as required herein. Print logs, data, and records on white bond paper bound together in report form.
      b. Certified accurate and complete by Balancing Agency's certified test and balance engineer.
      c. Contain following general data in format selected by Balancing Agency.
         1) Project Number.
         2) Project Title.
         3) Project Location.
         4) Project Mechanical Engineer.
         5) Test and Balance Agency and Certified Engineer.
         6) Contractor and mechanical sub-contractor.
         7) Dates tests were performed.
         8) Certification Document.
         9) Report Forms similar to AABC Standard format.
      d. Report shall include following:
         1) Preface suggesting abnormalities and problems encountered.
         2) Instrumentation List including type, model, manufacturer, serial number, and calibration dates.
         3) System Identification reporting location of zones, supply, return, and exhaust openings.
         4) Record following for each piece of air handling equipment:

a) Manufacturer, model number, and serial number.
b) Design and manufacturer rated data.
c) Actual CFM.
d) Suction and discharge static pressure of each fan.
e) Outside-air and return-air total CFM.
f) Actual operating current, voltage, and brake horsepower of each fan motor.
g) Final RPM of each motor.
h) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
i) Belt size and quantity.
j) Static-pressure controls final operating set points.

3. Bind approved copy of report in Operations And Maintenance Manual for Division 23.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Work of this Section shall be performed by independent Air Testing And Balance Agency specializing in testing and balancing of heating, ventilating, and cooling systems to balance, adjust, and test air moving equipment, air distribution, and exhaust systems.
2. Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing. Work by this Agency shall be done under direct supervision of qualified heating and ventilating engineer employed by Agency.
3. Agency shall be approved in writing by Engineer.
4. Neither engineering consultant or anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

1.5 SCHEDULING

B. Award test and balance subcontract to Agency upon receipt of Notice To Proceed to allow Agency to schedule this work in cooperation with other Sections involved and to comply with completion date.

C. During construction, Agency shall inspect installation of pipe systems, sheet metal work, temperature controls, and other component parts of mechanical systems. Perform inspections as follows.
1. One inspection when 60 percent of ductwork is installed.
2. One inspection when 90 percent of equipment is installed.

D. Do not begin air testing and balancing until:
1. After completion of air cooling, heating, and exhaust systems including installation of specialties, devices, and new filters.
2. Proper function of control system components including electrical interlocks, damper sequences, air and water reset, and fire and freeze stats has been verified.
3. Automatic temperature controls have been calibrated and set for design operating conditions.
4. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Heating, ventilating, and cooling systems and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

3.2 FIELD QUALITY CONTROL

A. Site Tests:
   1. If requested, conduct tests in presence of Engineer.
   2. Instruments used by Agency shall be accurately calibrated and maintained in good working order.
   3. Air Testing And Balancing Procedure:
      a. Perform tests at high and low speeds of multi-speed systems and single speed systems. Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards:
         1) Fan Speeds: Furnaces And Fan Coil Units (with direct drive motors): Set fan speed to lowest possible setting that will achieve design CFM requirements. Adjust down from Contractor setting, if necessary.
         2) Current And Voltage: Measure and record motor current and voltage.
         3) Pitot-Tube Traverse: Perform pitot-tube traverse of main supply and return ducts to obtain total CFM.
         4) Outside Air: Test and adjust system minimum outside air by pitot-tube traverse.
         5) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
         6) Air Temperature: Take wet and dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
         7) Main Ducts: Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.
         8) Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
         9) Tolerances: Test and balance each diffuser, grille, and register to within 10 percent of design requirements.
         10) Identification: Identify the location and area of each grille, diffuser, and register. Record on air outlet data sheets.
         11) Description: Record size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
         12) Drafts: Adjust diffusers, grilles, and registers to minimize drafts.
      b. Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.

B. Final Inspection And Adjustments:
   1. System shall be balanced and reports submitted to Engineer before final inspection.
   2. Balancing Agency shall be represented at final inspection meeting by qualified testing personnel with balancing equipment and two copies of air balancing test report.
      a. Engineer will choose and direct spot balancing of one zone. Differences between the spot balance and test report will be justification for requiring repeat of testing and balancing for entire building. If recheck testing demonstrates measured flow deviation of 10 percent or

more from recorded information on report, report will be rejected and new inspection and report will be made and resubmitted.

b. Perform re-balancing in presence of Engineer and subject to its approval.
c. If re-balancing is required, submit revised air test and balance reports to Engineer before Substantial Completion.
d. Spot balance and rebalance shall be performed at no additional cost to Owner.

3. Where furnace supplied to job site provides over 5 percent more air than schedule requirements, rooms supplied by that furnace shall have their supply air quantities increased by ratio of actual total air quantity supplied to minimum air quantity required by furnace schedule.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install thermal wrap duct insulation as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3114: 'Low-Pressure Metal Ducts'.
   2. Section 23 3300: 'Acoustic Duct Accessories' for duct liner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Certainteed St Gobain, Valley Forge, PA www.certainteed.com.
   2. Johns-Manville, Denver, CO www.jm.com.
   3. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com or Toronto, ON (416) 593-4322.
   4. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
   5. Owens-Corning, Toledo, OH or Owens-Corning Canada Inc, Willowdale, ON www.owenscorning.com.

2.2 MATERIALS

A. Thermal Wrap Duct Insulation:
   1. 1-1/2 inch (38 mm) or 3 inch (76 mm) thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of 0.75 lb / per cu ft (12 kg / per cu m).
   2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F (24 deg C) maximum.
   3. Type One Acceptable Products:
      a. Type 75 standard duct insulation by Certainteed St Gobain.
      b. Microlite FSK by Johns-Manville.
      c. Duct Wrap FSK by Knauf Fiber Glass.
      d. Alley Wrap FSK by Manson Insulation Inc.
      e. FRK by Owens-Corning.
      f. Equal as approved by Engineer before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Thermal Wrap Duct Insulation:
   1. Install insulation as follows:

a. Within Building Insulation Envelope:
   1) 1-1/2 inches (38 mm) thick on rectangular outside air ducts and combustion air ducts.
   2) 1-1/2 inches (38 mm) thick on all round ducts.
b. Outside Building Insulation Envelope:
   1) 3 inch (76 mm) thick on round supply and return air ducts.
   2) 1-1/2 inch (38 mm) thick on rectangular, acoustically lined, supply and return air ducts.

2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches (50 mm).
   a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch (25 mm) thick.
   b. Remove insulation from lap before stapling.
   c. Staple seams at approximately 16 inches (400 mm) on center with outward clenching staples.
   d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.

B. Insulate outside of ceiling diffusers and diffuser drops same as ductwork.

END OF SECTION

SECTION 23 0719

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install insulation on above ground refrigerant piping and fittings as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0501: General Mechanical Requirements.

1.2 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Armacell, Mebane, NC www.armaflex.com.
      b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
      c. Foster Products Corp, Oakdale, MN www.fosterproducts.com.
      d. Johns-Manville, Denver, CO www.jm.com.
      e. Knauf, Shelbyville, IN www.knauffiberglass.com.
      f. Manson, Brossard, BC, Canada www.isolationmanson.com.
      g. Nitron Industries, Thousand Oaks, CA www.nitronindustries.com.
      h. Owens-Corning, Toledo, OH www.owenscorning.com or Owens-Corning Canada Inc, Willowdale, ON (416) 733-1600.
      i. Ramco, Lawrenceville, NJ www.ramco.com.
      j. Nomac, Zebulon, NC www.nomaco.com.
      k. Speedline Corp, Solon, OH www.speedlinepvc.com.

B. Materials:
   1. Refrigeration Piping System:
      a. Thickness:

Pipe Size, Outside Diameter	Insulation Thickness
One inch and smaller	1/2 inch
1-1/8 inch to 2 inch	3/4

1) One inch sheet for fittings as recommended by Manufacturer.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
   a) AP Armaflex 25/50 by Armacell.
   b) Nitrolite by Nitron Industries. White only for exterior.
   c) Nomaco K-Flex.

b. Joint Sealer:
   1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
      a) Armacell 520 by Armacell.
      b) Namaco K-Flex R-373.

c. Insulation Tape:
   1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
      a) Armaflex AP Insul Tape by Armacell.
      b) FT182 Tape by Nitron Industries.
      c) Elastomeric Foamtape by Nomac K-Flex.

d. Exterior Finish:
   1) For application to non-white, exterior insulation.
   2) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
      a) WB Armaflex Finish by Armacell.
      b) R-374 Protective Coating by Nomaco K-Flex.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before application of insulating materials, brush clean surfaces to be insulated and make free from rust, scale, grease, dirt, moisture, and any other deleterious materials.

B. Use drop cloths over equipment and structure to prevent adhesives and other materials spotting the work.

3.2 INSTALLATION

A. Refrigeration System Piping System:
   1. General:
      a. Install insulation in snug contact with pipe.
         1) Insulate flexible pipe connectors.
         2) Insulate thermal expansion valves with insulating tape.
         3) Insulate fittings with sheet insulation and as recommended by Manufacturer.
      b. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.
      c. Do not install insulation on lines through clamp assembly of pipe support. Butt insulation up against sides of clamp assembly.
      d. Stagger joints on layered insulation. Seal joints in insulation.
      e. Install insulation exposed outside building so 'slit' joint seams are placed on bottom of pipe.
      f. Paint exterior exposed, non-white insulation with two coats of specified exterior finish.
   2. System Requirements:
      a. Condensing Units: Install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve..

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Method of installing insulation shall be subject to approval of Engineer. Sloppy or unworkmanlike installations are not acceptable.

3.4 CLEANING

A. Leave premises thoroughly clean and free from insulating debris.

3.5 PROTECTION

A. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

END OF SECTION

SECTION 23 0933

DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. Included But Not Limited To:
   1. Furnish and install automatic temperature control system as described in Contract Documents.
   2. Reuse existing T-7350 thermostats and sensors.
   3. Furnish and install conductors and make connections to control devices, motors, and associated equipment.
   4. Assist in air test and balance procedure.

1.02 RELATED REQUIREMENTS

A. Section 23 0501 - Common Work Results for HVAC.

B. Section 23 3300 - Air Duct Accessories: Furnishing and installing of temperature control dampers.

C. Division 26:
   1. Furnishing and installing of raceway, conduit, and junction boxes, including pull wires, for temperature control system except as noted above.
   2. Power wiring to magnetic starters, disconnect switches, and motors.
   3. Motor starters and disconnect switches, unless integral with packaged equipment.

1.03 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. UL (DIR) - Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Action Submittals:
   1. Product Data:
      a. Installer to provide product literature or cut sheets for all products specified in Project.
      b. Installer to provide questions of control equipment locations to Mechanical Engineer prior to installation.

C. Informational Submittals:
   1. Certificates:
      a. Installer must provide 'Certificate of Sponsorship' signed from Approved Distributor with bid confirming Installer sponsorship.

D. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Provide Operations and Maintenance Manual as specified in Section 23 0501.
      b. Record Documentation:
         1) Installer's 'Certificate of Sponsorship'.

E. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

F. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
   1. Revise shop drawings to reflect actual installation and operating sequences.

2. Include submittals data in final "Record Documents" form.

G. Operation and Maintenance Data:
   1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
   2. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

H. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owners name and registered with manufacturer. Include copies in Operations and Maintenance Manual.

1.06 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to the following:
   1. Installer:
      a. Before bidding, obtain sponsorship from a local, Approved Distributor specified under PART 2 PRODUCTS of this specification. Initial requirements for sponsorship are:
         1) Installer to provide Distributor sponsorship by submitting 'Certificate of Sponsorship' as Informational Submittal with bid. Certificate available as Attachment in this Specification.

B. Perform work in accordance with NFPA 70.

C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

D. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer Contract List:
   1. Air Products & Controls Ltd; www.ap-c.com.
   2. Fire-Lite Alarms; www.firelite.com.
   3. Honeywell Inc; www.honeywell.com.
      a. Primary Contact: Chris Brinkerhoff, (801) 550-3344, chris.brinkerhoff@honeywell.com.
   4. ICCA Firex; www.icca.invensys.com.
   5. Insul_Guard:
      a. Primary Contact: Dan Craner, (801) 518-3733; insul_guard@comcast.net.
   6. System Sensor; www.systemsensor.com.
   7. Substitutions: See Section 01 6000 - Product Requirements.

B. Components:
   1. Controller, Wall Module:
      a. Controller and Display Kit:
         1) Approved Product.
            (a) Part Number Honeywell YCRL6438SR1000 consisting of following:
               (1) Unitary Controller: Honeywell CRL6438SR1000
               (2) Wall Module: Honeywell TS120
            (b) Wall Cover Plate: Honeywell 50002883-001.
            (c) Discharge Air / Return Air Sensors: Honeywell C7041B2005 20k ohms.
            (d) Outdoor Air Sensor: Honeywell C7041F2006.
            (e) Indoor Air Sensor:
               (1) Sylk bus network; Honeywell TR40.
            (f) Averaging sensor:
               (1) Sylk bus network; Honeywell TR40.
   2. Sealant Compound:

a. Description:
   1) Non hardening waterproof, vapor proof, self-adhesive for hot or cold application for sealing conduit openings against drafts, dust, moisture and noise.
b. Approved Product.
   1) Duct Seal Compound No. DS-130 by Gardner Bender; www.gardnerbender.com.
   2) Thumb-Tite Sealing Compound No. 4216-92 by Nu-Calgon; www.nucalgon.com.

3. Guard for Cultural Center Sensors:
   a. Match color of sensor.
   b. Approved Product.
      1) MSI-244 controller guard with integral wood base by Zimmerman Technologies.
      2) WMG 1 controller guard by Insul_Guard.
4. Duct Smoke Detectors:
   a. Duct mounted smoke detector in systems with airflow greater than 2000 CFM.
   b. Intelligent low flow photoelectric duct smoke detector with flash scan.
   c. Approved Product.
      1) System Sensor Model D4120.
5. Transformer:
   a. 120 / 24 V, 50VA Honeywell AT150F.
   b. 120 / 24 V, 75VA Honeywell AT175F.
6. Damper Actuators:
   a. Electric type equipped for Class I wiring.
   b. Shall not consume power during Unoccupied cycle or use chemicals or expandable media.
   c. Have built in spring return.
   d. Approved Product.
      1) Honeywell MS8105A1030/U.
      2) Honeywell MS8105A1130 with end switch.
7. Conductors:
   a. Color-coded and No. 16 and No. 12 AWG Type TWN, TFN, or THHN, stranded.
   b. Controller Cable: 12, 8, or 4 conductor, 18AWG solid copper wire, insulated with high-density polyethylene. Conductors parallel enclosed in brown PVC jacket (22 AWG cable not allowed).
   c. Echelon Network Ebus Communicating Cable:
      1) Class Two Quality Standard. See Section 01 6200:
         (a) CAT 4, 22 gauge (0.025 in) (0.645 mm), twisted pair, non-plenum and non-shielded cable.
8. Local Relay (RP) Panels For Chapel And Cultural Center Systems:
   a. 16-ga (1.59 mm) screw cover, painted sheet metal. Box with cover and knockouts, pre-wired terminal strips, relay, and transformer.
   b. Provide Labels with Distributor contact information on each panel.
   c. Approved Products.
      1) Standard: LDS Model RP-6.
9. CO2 Return Air Sensor:
   a. Duct mount with display.
   b. Approved Product.
      1) Honeywell: C7232B1006.

C. Operation Sequences:
1. Programmable controller shall control Unoccupied and Occupied status of fan system based on adjustable seven-day program. Fan shall run continuously in Occupied Mode and cycle in Unoccupied Mode.
2. Adjustable heating and cooling set points shall control space temperature by activating either heating or cooling equipment. Programmable controller provides automatic change over between heating and cooling.
3. Controller provides optional override by allowing timed override of program by pushing override on controller touch screen. This shall activate controller to Occupied Mode and system shall control to Occupied set point.
4. Minimum outdoor ventilation air damper, spring return type, shall open in controller Occupied Mode and remain closed in Unoccupied Mode.

5. Systems with CO2 sensor to control minimum, spring return type, outdoor ventilation air damper:
   a. Damper shall open in controller Occupied Mode only when CO2 sensor setpoint of 800 ppm is reached. Damper shall close if CO2 level drops below about 700 ppm.
   b. Damper shall remain closed in controller Unoccupied Mode.

PART 3 EXECUTION

3.01 INSTALLERS

A. Acceptable Installers. See Section 01 4301:

3.02 INSTALLATION

A. Interface With Other Work:
   1. Calibrate room controllers as required during air test and balance. Insulate sensor J-box with fiberglass insulation; expandable/ foam insulation is NOT acceptable.
   2. Install sealant compound, non hardening waterproof, vapor proof, self-adhesive for hot or cold application for sealing conduit openings against drafts, dust, moisture and noise.
   3. Instruct air test and balance personnel in proper use and setting of control system components.
   4. Install low voltage electrical wiring in accordance with Division 26 of these Specifications.

B. Echelon Communication: Ebus
   1. Ebus cable needs to be installed at least 12 inches (300 mm) from lighting, motors, or low voltage switching cables

C. Safety Controls: Interlock duct smoke detectors to keep heating, cooling, and system fan from operating when detector is energized.

D. Safety Controls:
   1. Interlock main return air duct smoke detectors to keep heating, cooling, and system fan from operating when detector is energized. Interlock smoke detector for combination fire / smoke dampers so fire / smoke damper closes on detection of smoke.
   2. Interlock gas valves with cooling compressors and supply air fan.
   3. Gas valves shall obtain their electrical control power from same circuit as supply fan motor.
   4. Check high limit thermostats furnished with heating equipment for correct operation. Gas valves shall close when duct temperature exceeds high limit setting. Perform this work immediately after wiring burner controls.
   5. Wire bonnet thermostatic switches to dissipate all heat in combustion chambers.
   6. Fresh air dampers shall close on fan shut-down, power failure, open fan motor disconnect switch, and when thermostat is in Unoccupied Mode.
   7. Gas burner safety controls furnished with furnace units shall be incorporated in control circuits for all modes of operation.
   8. Control twinned furnace systems, where two furnaces serve common supply and return plenums, as one unit with twinning kit. Motors shall start and stop together and gas valves operate together.

E. Mount damper actuators and actuator linkages external of airflow. Make certain dampers operate freely without binding or with actuator housing moving.

F. Paste copy of record control wiring diagram on back of relay panel door cover for each multiple furnace system.

3.03 FIELD QUALITY CONTROL

A. Field Tests:
   1. Calibrate, adjust, and set controls for proper operation, operate systems, and be prepared to prove operation of any part of control system. This work is to be completed before pre-substantial completion inspection.
   2. Test each individual heating, cooling, and damper control for proper operation using control system.

3.04 SYSTEM STARTUP

1. Contractor is responsible configuring all controllers with proper zone names, zone scheduling, proper Church conference / holiday scheduling, all to be coordinated with local FM manager. Set proper clock setting including day/month/year.
2. Set Heating / Cooling to proper stages

3. Set heat cycle rates to 9 cph and cooling to 4 cph.
4. Set DO1 relay to "Occupancy".
5. Set System switch operation to "Automatic" changeover.
6. Set fan switch operation to "ON".
7. Set minimum UnOcc start time for all days. No days shall be scheduled Unconfigured.
8. Set Occupied start times to match meeting start times; provided by local FM manager.
9. Place all zone over-ride durations to one (1) hour except for Bishop and Stake area which shall be set to two (2) hours.
10. Set Occupied default heating setpoints to 70 degrees, cooling setpoints to 74 degrees.
11. Set Unoccupied default heating setpoint to 60 degrees, cooling setpoints to 90 degrees. Moist/Humid areas set unoccupied cooling at 80F
12. Set each zone to applicable Holiday scheduling for General & Stake Conferences.

3.05 ADJUSTING

A. Existing T-7350 controller configuration settings; the following are configuration guidelines for consistent installations:

1. Temperature Units: Fahrenheit/ Celsius
2. Equipment Type: Conventional/heat pump
   a. Stages of Heat 1,2
   b. Stages of Cool 1,2
   c. Fan operation in heat mode Enable Fan w/ Heat
3. Equipment Options:
   a. Leave at Default
   b. Heating Cycles per Hour 6-9 cph
   c. Cooling Cycles per Hour 3-4 cph
4. Recovery:
   a. Leave at Default.
5. Economizer / DLC:
   a. Configure as required by control equipment.
6. Sensor Selection:
   a. Set according to averaging sensors.
   b. Set to multi sensor "Smart" when averaging.
   c. Set Occupancy Sensor to "Disable".
7. Terminal Assignment:
   a. Set according to equipment.
   b. Set Terminal DO1 to Occupancy to control fresh air damper based upon scheduled occupancy or over-ride.
8. Dehumidification:
   a. Leave at default.
   b. See Accessory Loops.
9. Miscellaneous:
   a. Leave at default.
10. Sensor setting:
    a. Leave at default.
    b. Set as Required
11. Accessory Loops - Set as required:
    a. Hot water valve
    b. Dehumidification
    c. Other.
12. Configure Zone Name (display on Home Screen).
13. Set Password to ABCD.
14. Set Occupied Setpoint.
15. Set Unoccupied Setpoint
16. Set Schedule.
17. MENU/ Holiday-Event Scheduler / Custom Events/ Create new event:
    a. Mountain Time Zone:

1) First Sunday in April: Unoccupied all zones for all day / every year.
2) First Sunday in April: Unoccupied all zones for all day / every year.
3) First Sunday in October: Unoccupied all zones for all day / every year.
4) First Sunday in October: Unoccupied all zones for all day / every year.

3.06 CLOSEOUT ACTIVITIES

A. Instruction of Owner:
   1. Include as part of training required in Section 23 0501, following training:
      a. Training shall be by personnel of installing company and utilize operator's manuals and as-built documentation.
      b. First session will occur between system completion and Substantial Completion.
      c. Second session will occur within forty-five (45) days of Substantial Completion when agreed upon by Owner.
      d. Training shall include sequence of operation review, selection of displays, modification of schedules and setpoints, troubleshooting of sensors, etc, as follows:
         1) Control System Overview:
            (a) Show access to system through both individual controllers and Internet browser and how network works. Scheduling building at minimum for Stake and General Conference, special events.
         2) Controller Programming from Keypad: Instructions on developing setpoints and schedules and adjusting local zone temperatures.
         3) Web Internet training with local Facilities Manager during two (2) sessions.
            (a) Review all features accessible from the 'Settings' tab including Alarm points, user access, scheduling and humidity setpoints (where applied).

3.07 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.08 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate complete and operating system to Owner.

3.09 MAINTENANCE

A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. Provide service and maintenance of energy management and control systems for one years from Date of Substantial Completion.

C. Provide two complete inspections, one in each season, to inspect, calibrate, and adjust controls as required, and submit written reports.

D. Provide complete service of systems, including call backs. Make minimum of 2 complete normal inspections of approximately 2 hours duration in addition to normal service calls to inspect, calibrate, and adjust controls, and submit written reports.

SECTION 23 1123

FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gas piping and fittings within building as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0501: 'Common HVAC Requirements'.
   2. Section 23 0553: 'Identification for HVAC Piping and Equipment'.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / CSA Group:
      a. ANSI LC 4-2012 (2017) / CSA 6.32-2012 (R2016), 'Press-Connect Metallic Fittings for Use in Fuel Gas Distribution Systems'.
   2. ASTM International:
      a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
      b. ASTM A234/A234M-16, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service'.
      c. ASTM D2513-16a, 'Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings'.
   3. International Code Council (ICC):
      a. ICC IFGC-2018: 'International Fuel Gas Code'.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Conform to requirements of requirements of IFGC International Fuel Gas Code.
   2. Viega MegaPressG fittings:
      a. Conform to requirements of Canadian Standards Association CSA B149.1 and to requirements of IFGC International Fuel Gas Code.

B. Qualifications:
   1. Welders:
      a. Welders shall be certified and bear evidence of certification thirty (30) days before commencing work on project.
      b. If there is doubt as to proficiency of welder, Owner's Representative may require welder to take another test. This shall be done at no cost to Owner. Certification shall be by Pittsburgh Testing Laboratories or other approved authority.
   2. Pipe Installers:
      a. Polyethylene pipe installers shall be properly trained and certified in procedure for joining polyethylene pipe.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:
   1. Do not store polyethylene pipe so it is exposed to sunlight.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. BrassCraft, Novi, MI www.brasscraft.com.
      b. Cimberio Valve Co Inc, Malvern, PA www.cimberio.com.
      c. ConBraCo Industries, Inc, Matthews, NC www.conbraco.com or ConBraCo / Honeywell Ltd, Scarborough, ON (416) 293-8111.
      d. Dormont Manufacturing Company, Export, PA www.dormont.com.
      e. Jenkins-NH-Canada, Brantford, ON www.jenkins-nh-canada.com.
      f. Jomar International, Madison Heights, MI www.jomar.com.
      g. California Valves (formally KOSO) by Pacific Seismic Products Inc, Lancaster, CA, Distributed by Strand Earthquake Consultants www.strandearthquake.net.
      h. Viega LLC, Broomfield, CO www.viega.com.
      i. Watts Regulator Co, North Andover, MA www.wattsreg.com or Watts Industries (Canada) Inc, Burlington, ON (888) 208-8927.

B. Materials:
   1. Above-Ground Pipe:
      a. Black carbon steel, butt welded, Schedule 40 pipe meeting requirements of A53/A53M.
   2. Above-Ground Pipe Fittings:
      a. Welded forged steel fittings meeting requirements of ASTM A234/A234M.
      b. Standard weight malleable iron screwed.
      c. Viega MegaPressG fittings.
   3. Valves:
      a. 125 psi (862 kPa) bronze body ball valve, UL listed.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) CIM 102.1 by Cimbrio Valve.
         2) Apollo Series 80-100 by ConBraCo.
         3) 'Red Cap' R602 by Jenkins NH Canada.
         4) Model T-204 by Jomar International.
         5) Model B-6000-UL by Watts Regulator.
   4. Cocks:
      a. Gauge Cocks: Conbraco Series 50-56 bronze gauge cock.
   5. Flexible Connector:
      a. Type 304 stainless steel corrugated tube coated for corrosion protection.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) Dormont Supr-Safe.
         2) BrassCraft Procoat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Steel pipe installed through air plenums, in walls:
   1. Pipes 2-1/2 inches (64 mm) and larger shall have welded fittings and joints.

2. Other steel pipe may have screwed or welded fittings.
3. Viega MegaPressG:
    a. Install MegaPressG fittings according to Manufacture's recommendations and with Manufacture's recommended tools.

B. On lines serving gas-fired equipment, install gas cocks adjacent to equipment outside of equipment cabinet and easily accessible.

C. Install 6 inch (150 mm) long minimum dirt leg, with pipe cap, on vertical gas drop serving each gas-fired equipment unit.

D. Use fittings for changes of direction in pipe and for branch runouts.

E. Visible gas piping inside building shall be painted yellow and labeled.

3.2 FIELD QUALITY CONTROL

A. Field tests:
1. Subject all portions of gas piping system, in sections or in entirety, to air pressure of 75 psig (0.52 MPa) and prove airtight for four (4) hours.
2. Disconnect equipment not suitable for 75 psig (0.52 MPa) pressure from piping system during test period.

END OF SECTION

SECTION 23 2300

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install piping and specialties for refrigeration systems as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0501: Common HVAC Requirements.
   2. Section 23 0719: Refrigerant Piping Insulation.
   3. Section 23 6213: Air-Cooled Refrigerant Condensers.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A36-08, 'Standard Specification for Carbon Structural Steel.'
      b. ASTM B280-08, 'Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.'
   2. American Welding Society / American National Standards Institute:
      a. AWS / ANSI A5.8-2004, 'Specification for Brazing and Braze Welding.'

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Show each individual equipment and piping support.

B. Informational Submittals:
   1. Qualification Statements: Technician certificate for use of CFC and HCFC refrigerants.

1.4 QUALITY ASSURANCE

A Qualifications:
   1. Installer: Refrigerant piping shall be installed by a refrigeration subcontractor licensed by State and by technicians certified in use of CFC and HCFC refrigerants.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Airtec, Fall River, MA, www.noventcaps.com.

b. Cush-A-Clamp by ZSI Manufacturing, Canton, MI www.cushaclamp.com.
c. Elkhart Products Corp, Elkhart, IN www.elkhartproducts.com.
d. Emerson Climate Technologies, St Louis, MO www.emersonflowcontrols.com.
e. Handy & Harman Products Division, Fairfield, CT www.handy-1.com.
f. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
g. Henry Valve Co, Melrose Park, IL www.henrytech.com.
h. Hilti Inc, Tulsa, OK www.hilti.com.
i. Hydra-Zorb Co, Auburn Hills, MI www.hydra-zorb.com.
j. Mueller Steam Specialty, St Pauls, NC www.muellersteam.com.
k. Nibco Inc, Elkhart, IN www.nibco.com.
l. Packless Industries, Waco, TX www.packless.com.
m. Parker Corp, Cleveland, OH www.parker.com.
n. Sporlan Valve Co, Washington, MO www.sporlan.com.
o. Sherwood Valves, Washington, PA www.sherwoodvalve.com.
p. Thomas & Betts, Memphis, TN www.superstrut.com.
q. Unistrut Corp, Wayne, MI www.unistrut.com.
r. Universal Metal Hose, Chicago, IL www.universalmetalhose.com.
s. Vibration Mountings & Controls, Bloomingdale, NJ www.vmc-kdc.com.
t. Virginia KMP Corp, Dallas, TX www.virginiakmp.com.

B. Materials:
1. Refrigerant Piping:
   a. Meet requirements of ASTM B280, hard drawn straight lengths. Soft copper tubing not permitted.
   b. Do not use pre-charged refrigerant lines.
2. Refrigerant Fittings:
   a. Wrought copper with long radius elbows.
   b. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      1) Mueller Streamline.
      2) Nibco Inc.
      3) Elkhart.
3. Connection Material:
   a. Brazing Rods in accordance with ANSI / AWS A5.8:
      1) Copper to Copper Connections:
         a) Classification BCuP-4 Copper Phosphorus (6 percent silver).
         b) Classification BCuP-5 Copper Phosphorus (15 percent silver).
      2) Copper to Brass or Copper to Steel Connections: Classification BAg-5 Silver (45 percent silver).
      3) Do not use rods containing Cadmium.
   b. Flux:
      1) Type Two Acceptable Products:
         a) Stay-Silv White Brazing Flux by Harris Products Group.
         b) High quality silver solder flux by Handy & Harmon.
         c) Equal as approved by Engineer before use. See Section 01 6200.
4. Valves:
   a. Expansion Valves:
      1) For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
      2) Size valves to provide full rated capacity of cooling coil served. Coordinate selection with evaporator coil and condensing unit.
      3) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
         a) Emerson Climate Technologies.
         b) Henry.
         c) Mueller.
         d) Parker.

e) Sporlan.

b. Manual Refrigerant Shut-Off Valves:
   1) Ball valves designed for refrigeration service and full line size.
   2) Valve shall have cap seals.
   3) Valves with hand wheels are not acceptable.
   4) Provide service valve on each liquid and suction line at compressor.
   5) If service valves come as integral part of condensing unit, additional service valves shall not be required.
   6) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      a) Henry.
      b) Mueller.
      c) Sherwood.
      d) Virginia.

5. Filter-Drier:
   a. On lines 3/4 inch (19 mm) outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
   b. On lines smaller than 3/4 inch (19 mm) outside diameter, filter-drier shall be sealed type with brazed end connections.
   c. Size shall be full line size.
   d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      1) Emerson Climate Technologies.
      2) Mueller.
      3) Parker.
      4) Sporlan.
      5) Virginia.

6. Sight Glass:
   a. Combination moisture and liquid indicator with protection cap.
   b. Sight glass shall be full line size.
   c. Sight glass connections and sight glass body shall be solid copper or brass, no copper-coated steel sight glasses allowed.
   d. Category Four Approved Product. See Section 01 6200 for definitions of Categories:
      1) HMI by Emerson Climate Technologies.

7. Refrigerant Piping Supports:
   a. Base, Angles, And Uprights: Steel meeting requirements of ASTM A 36.
   b. Securing Channels:
      1) At Free-Standing Pipe Support:
         a) Class One Quality Standard: P-1000 channels by Unistrut.
         b) Acceptable Manufacturers: Hilti, Thomas & Betts.
         c) Equal as approved by Engineer before installation. See Section 01 6200.
      2) At Wall Support:
         a) Class One Quality Standard: P-3300 channels by Unistrut.
         b) Acceptable Manufacturers: Hilti, Thomas & Betts.
         c) Equal as approved by Engineer before installation. See Section 01 6200.
      3) At Suspended Support:
         a) Class One Quality Standard: P-1001 channels by Unistrut.
         b) Acceptable Manufacturers: Hilti, Thomas & Betts.
         c) Equal as approved by Engineer before installation. See Section 01 6200.
      4) Angle Fittings:
         a) Class One Quality Standard: P-2626 90 degree angle by Unistrut.
         b) Acceptable Manufacturers: Hilti, Thomas & Betts.
         c) Equal as approved by Engineer before installation. See Section 01 6200.
   c. Pipe Clamps:
      1) Type Two Acceptable Manufacturers:
         a) Hydra-Zorb.
         b) ZSI Cush-A-Clamp.

c) Hilti Cush-A-Clamp.
d) Equal as approved by Engineer before installation. See Section 01 6200.

8. Locking Refrigerant Cap:
   a. Provide and install on charging valves:
      1) Class One
      2) Class One Quality Standard: 'No Vent' locking refrigerant cap.
      3) Acceptable Manufacturers: Airtec.
      4) Equal as approved by Engineer before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refrigerant Lines:
   1. Install as high in upper mechanical areas as possible. Do not install underground or in tunnels.
   2. Slope suction lines down toward compressor one inch/10 feet (25 mm in 3 meters). Locate traps at vertical rises against flow in suction lines.

B. Connections:
   1. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary. No soft solder (tin, lead, antimony) connections will be allowed in system.
   2. Braze manual refrigerant shut-off valve, sight glass, and flexible connections.
   3. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.

C. Specialties:
   1. Install valves and specialties in accessible locations. Install refrigeration distributors and suction outlet at same end of coil.
   2. Install thermostatic bulb as close to cooling coil as possible. Do not install on vertical lines.
   3. Install equalizing line in straight section of suction line, downstream of and reasonably close to thermostatic bulb. Do not install on vertical lines.

D. Refrigerant Supports:
   1. Support Spacing:
      a. Piping 1-1/4 inch (32 mm) And Larger: 8 feet (2.450 m) on center maximum.
      b. Piping 1-1/8 inch (28.5 mm) And Smaller: 6 feet (1.80 m) on center maximum.
      c. Support each elbow.
   2. Isolate pipe from supports and clamps with Hydrozorb or Cush-A-Clamp systems.
   3. Run protective cover continuous from condensing units to risers or penetrations at building wall.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Make evacuation and leak tests in presence of Engineer after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
      a. Draw vacuum on each entire system with two stage vacuum pump. Draw vacuum to 300 microns using micron vacuum gauge capable of reading from atmosphere to 10 microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum.
      b. Break vacuum with nitrogen and re-establish vacuum test. Vacuum shall hold for 30 minutes at 300 microns without vacuum pump running.

c. Conduct tests at 70 deg F (21 deg C) ambient temperature minimum.
d. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
e. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.
f. Recover all refrigerant in accordance with applicable codes. Do not allow any refrigerant to escape to atmosphere.

2. If it is observed that refrigerant lines are being or have been brazed without proper circulation of nitrogen through lines, all refrigerant lines installed up to that point in time shall be removed and replaced at no additional cost to Owner.

END OF SECTION

SECTION 23 2600

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Coordinate installation of condensate drain piping with Section 22 0501 as described in Contract Documents.

B. Related Requirements:
   1. Section 22 0501: 'Common Plumbing Requirements'.
   2. Section 23 0501: 'Common HVAC Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Materials:
   1. Condensate Drains:
      a. Schedule 40 PVC for condensate drains from furnace combustion chambers and furnace cooling coils.
   2. Solvent Cement and Adhesive Primer:
      a. Use PVC solvent cement that has a VOC content of 510 g/L or less if required by local AHJ if required.
      b. Use adhesive primer that has a VOC content of 550 g/L or less if required by local AHJ if required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condensate Drains:
   1. Support piping and protect from damage.
   2. Do not combine PVC condensate drain piping from furnace combustion chamber with copper condensate drain piping from cooling coil.
   3. Condensate piping shall be Schedule 40 PVC.

END OF SECTION

SECTION 23 3114

LOW-PRESSURE METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0593: 'Duct Testing, Adjusting, And Balancing' for duct test, balance, and adjust air duct systems services provided by Owner.
   2. Section 23 0713: 'Duct Insulation' for thermal Insulation for ducts, plenum chambers, and casings.
   3. Section 23 3001: 'Common Duct Requirements'.

1.2 REFERENCES

A. Association Publications:
   1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
   2. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (4th edition).

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
   2. Underwriters Laboratories, Inc.:
      a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th Edition - 2018).

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Duct Sealer:
      a. Meet Class A flame spread rating in accordance with ASTM E84 or UL 723.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Duct Sealer:
      a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
      b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.

c. Store in a cool dry location, but never under 35 deg F (1.7 deg C) or subjected to sustained temperatures exceeding 110 deg F (43 deg C) or as per Manufacturer's written recommendations.
d. Do use sealants that have exceeded shelf life of product.

1.5 FIELD CONDITIONS

A. Ambient Conditions:
1. Duct Sealer:
a. Do not apply under 35 deg F (1.7 deg C) or subjected to sustained temperatures exceeding 110 deg F (43 deg C) or as per Manufacturer's written recommendations.
b. Do not apply when rain or freezing temperatures will occur within seventy two (72) hours.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:
1. Sheet Metal:
a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
2. Duct Sealer For Interior Ducts:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Duct Butter or ButterTak by Cain Manufacturing Co Inc, Pelham, AL www.cainmfg.com.
2) DP 1010, DP 1030 or DP 1015 by Design Polymerics, Fountain Valley, CA www.designpoly.com.
3) PROseal, FIBERseal, EVERseal, or EZ-seal by Ductmate Industries, Inc., Charleroi, PA www.ductmate.com.
4) SAS by Duro Dyne, Bay Shore, NY or Duro Dyne Canada, Lachine, QB www.durodyne.com.
5) Iron Grip 601 by Hardcast Inc, Wylie, TX www.hardcast.com.
6) MTS100 or MTS 200 by Hercules Mighty Tough, Denver CO, www.herculesindustries.com.
7) 15-325 by Miracle / Kingco, Div ITW TACC, Rockland, MA www.taccint.com.
8) 44-39 by Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
9) Airseal Zero by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
10) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com
3. Duct Sealer For Exterior Ducts:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Two Part II Sealing System including RTA-50 liquid adhesive and DT-5300 for 3 inch (76 mm) and DT 5400 for 4 inch (100 mm) tape by Hardcast Inc, Wylie, TX www.carlislehvac.com.

B. Fabrication:
1. General:
a. Straight and smooth on inside with joints neatly finished.
b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.
2. Standard Ducts:

a. General:
   1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.

PART 3 - EXECUTION

3.1 PREPARATION

A. Metal duct surface must be clean and free of moisture, contamination and foreign matter before applying duct sealer for interior and exterior ducts.

3.2 INSTALLATION

A. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer as per Manufacturer's written instructions. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.

B. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.

C. Ducts shall not bear on top of structural members.

D. Paint ductwork visible through registers, grilles, and diffusers flat black.

E. Properly flash where ducts protrude above roof.

F. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
   1. Air Test and Balance Testing as specified in Section 23 0593: 'Duct Testing, Adjusting, and Balancing'.

B. Non-Conforming Work:
   1. Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.
   2. Section 23 3001: 'Common Duct Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM C1071-16, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)'.
      c. ASTM C1338-14, 'Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings'.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. AGM Industries, Brockton, MA www.agmind.com.
      b. Air Balance Inc, Holland, OH www.airbalance.com.
      c. Air Filters Inc, Baltimore, MD www.afinc.com.
      d. Air-Rite Manufacturing, Bountiful, UT (801) 295-2529.
      e. American Warming & Ventilating, Holland, OH www.american-warming.com.
      f. Arrow United Industries, Wyalusing, PA www.arrowunited.com.
      g. Cain Manufacturing Company Inc, Pelham, AL www.cainmfg.com.
      h. C & S Air Products, Fort Worth, TX www.csairproducts.com.
      i. CertainTeed Corp, Valley Forge, PA www.certainteed.com.
      j. Cesco Products, Florence, KY www.cescoproducts.com.
      k. Daniel Manufacturing, Ogden, UT (801) 622-5924.
      l. Design Polymerics, Fountain Valley, CA www.designpoly.com.
      m. Ductmate Industries Inc, East Charleroi, PA www.ductmate.com.
      n. Duro Dyne, Bay Shore, NY www.durodyne.com.
      o. Dyn Air Inc. Lachine, QB www.dynair.ca
      p. Elgen Manufacturing Company, Inc. East Rutherford, NJ www.elgenmfg.com
      q. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com.
      r. Greenheck Corp, Schofield, WI www.greenheck.com.
      s. Gripnail Corp, East Providence, RI www.gripnail.com.
      t. Hardcast Inc, Wylie, TX www.hardcast.com.

u. Hercules Industries, Denver, CO, www.herculesindustries.com.
v. Honeywell Inc, Minneapolis, MN www.honeywell.com.
w. Industrial Acoustics Co, Bronx, NY www.industrialacoustics.com.
x. Johns-Manville, Denver, CO www.jm.com.
y. Kees Inc, Elkhart Lake, WI www.kees.com.
z. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com.
aa. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
bb. Metco Inc, Salt Lake City, UT (801) 467-1572 www.metcospiral.com.
cc. Miracle / Kingco, Rockland, MA www.taccint.com.
dd. Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
ee. Nailor Industries Inc, Houston, TX www.nailor.com.
ff. Owens Corning, Toledo, OH www.owenscorning.com.
gg. Polymer Adhesive Sealant Systems Inc, Irving, TX www.polymeradhesives.com.
hh. Pottorff Company, Fort Worth, TX www.pottorff.com.
ii. Ruskin Manufacturing, Kansas City, MO www.ruskin.com.
jj. Sheet Metal Connectors Inc, Minneapolis, MN www.smconnectors.com.
kk. Tamco, Stittsville, ON www.tamco.ca.
ll. Techno Adhesive, Cincinnati, OH www.technoadhesives.com.
mm. Titus, Richardson, TX (972) 699-1030. www.titus-hvac.com
nn. McGill AirSeal, Columbus, OH www.mcgillairseal.com.
oo. United Enertech Corp, Chattanooga, TN www.unitedenertech.com.
pp. Utemp Inc, Salt Lake City, UT (801) 978-9265.
qq. Ventfabrics Inc, Chicago, IL www.ventfabrics.com.
rr. Ward Industries, Grand Rapids MI www.wardind.com.
ss. Young Regulator Co, Cleveland, OH www.youngregulator.com.

B. Materials:
1. Acoustical Liner System:
a. Duct Liner:
1) One inch (25 mm) thick, 1-1/2 lb (0.68 kg) density fiberglass conforming to requirements of ASTM C1071. Liner will not support microbial growth when tested in accordance with ASTM C1338.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) ToughGard by CertainTeed.
b) Duct Liner E-M by Knauf Fiber Glass.
c) Akousti-Liner by Manson Insulation.
d) Quiet R by Owens Corning.
e) Linacoustic RC by Johns-Manville.
b. Adhesive:
1) Category Four Approved Water-Based Products. See Section 01 6200 for definitions of Categories:
a) Cain: Hydrotak.
b) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
c) Duro Dyne: WSA.
d) Elgen: A-410-WB.
e) Hardcast: Coil-Tack.
f) Hercules: Mighty Tough Adhesives MTA500 or MTA600.
g) Miracle / Kingco: PF-101.
h) Mon-Eco: 22-67 or 22-76.
i) Polymer Adhesive: Glasstack #35.
j) Techno Adhesive: 133.
k) McGill AirSeal: Uni-tack.
2) Category Four Approved Solvent-Based (non-flammable) Products. See Section 01 6200 for definitions of Categories:
a) Cain: Safetak.
b) Duro Dyne: FPG.

c) Hardcast: Glas-Grip 648-NFSE.
d) Miracle / Kingco: PF-91.
e) Mon-Eco: 22-24.
f) Polymer Adhesive: Q-Tack.
g) Techno Adhesive: 'Non-Flam' 106.

3) Category Four Approved Solvent-Based (flammable) Products. See Section 01 6200 for definitions of Categories:
a) Cain: HV200.
b) Duro Dyne: MPG.
c) Hardcast: Glas-Grip 636-SE.
d) Miracle / Kingco: PF-96.
e) Mon-Eco: 22-22.
f) Polymer Adhesive: R-Tack.
g) Techno Adhesive: 'Flammable' 106.

c. Fasteners:
1) Adhesively secured fasteners not allowed.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) AGM Industries: 'DynaPoint' Series RP-9 pin.
b) Cain.
c) Duro Dyne.
d) Gripnail: May be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.

2. Flexible Equipment Connections:
a. 30 oz closely woven UL approved glass fabric double coated with neoprene.
b. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 200 deg F (93 deg C).
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Cain: N-100.
2) Duro Dyne: MFN.
3) Dyn Air: CPN with G-90 galvanized off-set seam.
4) Elgen: ZLN / SDN.
5) Ventfabrics: Ventglas.
6) Ductmate: ProFlex.

3. Duct Access Doors:
a. General:
1) Factory built insulated access door with hinges and sash locks, as necessary. Construction shall be galvanized sheet metal, 24 ga (0.635 mm) minimum.
2) Fire and smoke damper access doors shall have minimum clear opening of 12 inches (300 mm) square or larger as shown on Drawings.
b. Rectangular Ducts:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Air Balance: Fire/Seal FSA 100.
b) Air-Rite: Model HAD-2.
c) Cesco: HDD.
d) Elgen: TAB Type / Hinge and Cam.
e) Flexmaster: Spin Door.
f) Kees: ADH-D.
g) Nailor: 08SH.
h) Pottorff: 60-HAD.
i) Ruskin: ADH-24.
j) United Enertech: L-95.
c. Motorized Outside Air Dampers:
1) General:
a) Low leakage type. AMCA certified.

b) Make provision for damper actuators and actuator linkages to be mounted external of air flow.

2) Rectangular Ducts:
   a) Damper Blades:
      (1) Steel or aluminum airfoil type with mechanically locked blade seals, 8 inch (200 mm) blade width maximum measured perpendicular to axis of damper.
      (2) Jamb seals shall be flexible metal compression type.
      (3) Opposed or single blade type.
   b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      (1) Air Balance: AC 526.
      (2) American Warming: AC526.
      (3) Arrow: AFD-20.
      (4) C & S: AC50.
      (5) Cesco: AGO3.
      (6) Nailor: 2020.
      (7) Pottorff: CD-52.
      (8) Ruskin: CD-60.
      (9) Tamco: Series 1000.
      (10) United Enertech: CD-150 or CD-160.

4. Air Turns:
   a. Single thickness vanes. Double thickness vanes not acceptable.
   b. 4-1/2 inch (115 mm) wide vane rail. Junior vane rail not acceptable.
5. Branch Tap for Flexible Ductwork:
   a. Factory-manufactured rectangular-to-round 45 degree leading tap fabricated of 24 ga (0.635 mm) zinc-coated lock-forming quality steel sheets meeting requirements of ASTM A653, with G-90 coating.
   b. One inch wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.
   c. Manual Volume Damper:
      1) Single blade, 22 ga (0.79 mm) minimum
      2) 3/8 inch (9.5 mm) minimum square rod with brass damper bearings at each end.
      3) Heavy-duty locking quadrant on 1-1/2 inch (38 mm) high stand-off mounting bracket attached to side of round duct.
   d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) ST-1HD by Air-Rite:
         a) Nylon damper bearings approved for Air-Rite.
      2) STO by Flexmaster.
      3) HET by Sheet Metal Connectors.

C. Fabrication:
1. Duct Liner:
   a. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch (19 mm) long mechanical fasteners 12 inches (300 mm) on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
   b. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
   c. Coat longitudinal and transverse edges of liner with adhesive.
2. Air Turns:
   a. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
   b. Quiet and free from vibration when system is in operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Duct Liner:
   1. Furnish and install acoustic lining in following types of rectangular ducts unless noted otherwise on Contract Documents:
      a. Supply air.
      b. Return air.
      c. Mixed air.
      d. Transfer air.
      e. Relief air.
      f. Elbows, fittings, and diffuser drops greater than 12 inches (300 mm) in length.
   2. Do not install acoustic lining in round ducts.

B. Flexible Connections: Install flexible inlet and outlet duct connections to each furnace.

C. Access Doors In Ducts:
   1. Install at each manual outside air damper and at each motorized damper. Locate doors within 6 inches (150 mm) of installed dampers.
   2. Install within 6 inches (150 mm) of fire dampers and in Mechanical Room if possible. Install on side of duct that allows easiest access to damper.

D. Dampers And Damper Accessories:
   1. Install concealed ceiling damper regulators.
      a. Paint cover plates to match ceiling tile.
      b. Do not install damper regulators for dampers located directly above removable ceilings or in Mechanical Rooms.
   2. Provide each take-off with an adjustable volume damper to balance that branch.
      a. Anchor dampers securely to duct.
      b. Install dampers in main ducts within insulation.
      c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
      d. Where concealed ceiling damper regulators are installed, provide cover plate.
   3. Install motorized dampers.

END OF SECTION

SECTION 23 4100

AIR FILTERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install filters used in mechanical equipment.

B. Related Requirements:
   1. Section 23 3001: 'Common Duct Requirements'.
   2. Section 23 5417: 'Gas Fired Furnaces'.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Furnace Filters: One inch (25 mm) thick throw-away type as recommended by Furnace Manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide ample access for filter removal.

3.2 FIELD QUALITY CONTROL

A. Inspection: At date of Substantial Completion, air filters shall be new, clean, and approved by Owner's representative.

END OF SECTION

SECTION 23 5417

GAS-FIRED FURNACES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install horizontal/vertical gas-fired condensing furnaces as described in Contract Documents.

B. Related Sections:
   1. Section 23 0501: 'Common HVAC Requirements'.
   2. Section 23 1123: 'Facility Natural Gas Piping'.
   3. Section 23 2300: 'Refrigerant Piping'.
   4. Section 23 4100: 'Air Filters'.
   5. Section 23 5135: 'Air Piping'.
   6. Section 23 6215: Air Cooled Refrigerant Condensers

1.2 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Reports: Equipment check-out sheets.

B. Special Procedure Submittals:
   1. Installer must register with Manufacturer before submitting Manufacturer Warranty:
      a. Installer to contact Owner's Representative (FM Group or Project Manager) for following MANDATORY information to be given to Manufacturer before Manufacturer will issue Manufacturer's 'Special LDS Warranty' included with Closing Submittal:
         1) This must be given to Manufacturer:
            a) Name of Owner (name of FM Group) _____
            b) Mailing Address (FM office address) _____
            c) Building Property ID (unique 7-digit identifier) _____
            d) Project site address: _____
            e) Model Number of each Unit _____
            f) Serial Number of each Unit _____
            g) Date of Installation / Startup _____
      b. Product Data for Prerequisite EQ 1:
         1) Documentation indicating that units comply with ANSI/ASHRAE 62.1, Section 5 - 'Systems and Equipment'.
      c. Product Data for Credit EQ 4.1:
         1) For solvent cements and adhesive primers, including printed statement of VOC content.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800
      a. Warranty Documentation:
         1) Final, executed copy of Manufacturer's 'Special LDS Warranty' including required Owner / Manufacturer mandatory information.
      b. Record Documentation:
         1) Manufacturers Documentation:

a) Equipment checkout sheet: Complete and sign all items for each unit.

1.3 WARRANTY

A. Manufacturer's Warranty:
   1. Provide Manufacturer's 'Special LDS Warranty' for the following:
      a. Provide fifteen (15) year minimum limited warranty of heat exchanger.
      b. Provide five (5) year limited warranty on parts.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Carrier Corporation:
         1) Carrier National: Bradley Brunner (270) 282-1241 Bradley.M.Brunner@Carrier.com.
         2) Carrier Utah: Bret Adams (Contractors Heating/Cooling Supply) (801) 224-1020 ext. 2527 bret.adams@mc.supply
      b. Lennox Industries:
         1) For pricing and information contact: Lennox Mountain Commercial @ 1-800-972-3283.
         2) Lennox National Contact: Jeff Barrett (801) 556-6114 jeff.barrett@lennoxind.com
      c. York (US Air Conditioning Distributors):
         1) Nick Filimoehala (801) 463-5323 n.filimoehala@us-ac.com.

B. Design Criteria:
   1. Rated at 92 percent minimum AFUE (Annual Fuel Utilization Efficiency) calculated in accordance with DOE test procedures.

C. Manufactured Units:
   1. Furnaces:
      a. Factory assembled units certified by AGA complete with blower section, furnace section, steel casing, piped, and wired.
      b. Blower section shall consist of cabinet, blower, and motor.
         1) Cabinet shall be of 22 ga (0.8 mm) minimum cold rolled steel and have finish coat of baked-on enamel.
         2) Blower shall be Class 1, full DIDW, statically and dynamically balanced.
      c. Automatic controls shall consist of:
         1) Manual gas shut-off valve.
         2) Operating automatic gas valve.
         3) Solid-state type fan and thermal limit controls.
         4) 24-volt transformer.
         5) Hot surface ignition system.
      d. Blower shall be driven by multi-speed direct driven motor.
      e. Furnace section shall be enclosed in 22 ga (0.8 mm) minimum enameled steel casing lined with foil covered insulation.
      f. Heat Exchanger: Aluminized steel.
      g. Gas Burners: Aluminized steel.
      h. PVC intake of outside air and PVC combustion product exhaust, with sealed combustion, direct vent system.
      i. Concentric roof termination kit for roof mounting.

j. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Standard Furnaces:
a) Carrier
b) Lennox
c) York
d) Others to be prior approved by engineer prior to bidding

2. Cooling Coil:
a. Cooling coil shall consist of heavy gauge steel cabinet with baked-on enamel finish to match furnace:
1) Coil shall have aluminum fins bonded to seamless copper or aluminum tubing.
2) Coil shall be ARI rated. Provide drain pans with connections at one end.
3) Use thermal expansion valve.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Vertical:
a) Carrier
b) Lennox
c) York
d) Others to be prior approved by engineer prior to bidding

2.2 ACCESSORIES

A. Filter Frame:
1. Build filter frame external to furnace as detailed on Contract Drawings.

B. Vibration Isolators:
1. Horizontal Installation:
a. Neoprene hanger type with load of 75 lbs (34 kg) maximum.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) RH by Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
2) Mason Industries, Hauppage, NY www.mason-ind.com.
3) RH by Vibration Mounting & Controls, Bloomingdale, NJ www.vmc-kdc.com.
2. Vertical Installation: 4 inches (100 mm) square by 1/2 inch (13 mm) thick minimum neoprene type vibration isolation pads.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Vibration Isolators:
1. Install vibration isolator on each hanger rod supporting horizontal furnace and under each corner of vertical furnace.

3.2 FIELD QUALITY CONTROL

A. Manufacturer Services:
1. Furnace installer shall:
a. Verify proper gas orifice size.
b. Clock gas meter for rated input.
c. Verify and set gas pressure at furnace.
d. Check and measure temperature rise.
e. Check safety controls for proper operation.

f. Check combustion vent sizes and combustion air sizes.

2. In addition, furnace installer shall start up, check out, and adjust furnaces using equipment check-out sheet provided by Manufacturer. Complete and sign all items on sheet.

END OF SECTION

SECTION 23 5135

AIR PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install heating equipment exhaust piping and combustion air intake piping as described in Contract Documents.

B. Related Requirements:
   1. Section 23 0501: 'Common HVAC Requirements'.
   2. Section 23 5417: 'Gas-Fired Furnaces'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM D1785-12, 'Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120'.
      b. ASTM D2564-12, 'Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'.
      c. ASTM D2661-11, 'Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings'.
      d. ASTM D2665-14, 'Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings'.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Armaflex by Armacell, Mebane, NC www.armaflex.com.
      b. Nomaco, Youngsville, NC www.nomacokflex.com.

B. Materials:
   1. Air Piping: Schedule 40 pipe and fittings meeting requirements of ASTM D1785, ASTM D2661, or ASTM D2665.
   2. Solvent Cement and Adhesive Primer:
      a. Use PVC solvent cement that has a VOC content of 510 g/L or less if required by local AHJ if required.
      b. Use adhesive primer that has a VOC content of 550 g/IL or less if required by local AHJ if required.
      c. Meet requirements of ASTM F656 for cement primer and ASTM D2564 for pipe cement.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation For Condensing Furnaces:
   1. Run individual vent and individual combustion intake piping from each furnace to concentric roof termination kit provided by Furnace Manufacturer. Slope lines downward toward furnace.
   2. Slope combustion chamber drain downward to funnel drain. Anchor to wall with wall clamps, allowing free movement through clamp for expansion.
   3. Use concentric roof termination kit provided by Furnace Manufacturer. Install vent and combustion air intake piping at clearance and distances required by Furnace Manufacturer.
   4. Attach factory-supplied neoprene coupling to combustion-air inlet connection and secure with clamp.
   5. Ensure that factory-supplied perforated metal disc is installed in flexible coupling, unless its removal is required.
   6. York Furnaces: Install air piping on side of furnace in horizontal or vertical installation.

B. Support:
   1. Support concentric roof termination kit at ceiling or roof line with 20 ga (0.912 mm) sheet metal straps as detailed on Drawings.
   2. Support horizontal and sloping sections of pipe with 1 inch (25 mm) wide 20 ga (1.0058 mm) galvanized steel straps. Anchor securely to structure, not allowing pipe to sway.

END OF SECTION

SECTION 23 6213

AIR-COOLED REFRIGERANT CONDENSERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install condensing units as described in contract documents.

B. Related Sections:
   1. Section 23 0501: Common HVAC Requirements.
   2. Section 23 2300: Refrigerant Piping System.

1.2 SUBMITTALS

A. Informational Submittals:
   1. Tests and Evaluation Reports:
      a. Manufacturer Reports: Equipment check-out sheets.
   2. Qualification Statements:
      a. Technician certificate for use of CFC, HFC, and HCFC refrigerants.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Each unit shall be UL / ULC labeled.

B. Qualifications. Section 01 4301 applies, but is not limited to the following:
   1. Installer: Refrigerant piping shall be installed by refrigeration contractor licensed by State and by technicians certified in use of CFC and HCFC refrigerants.

1.4 WARRANTY

A. Manufacturer's Warranty:
   1. Provide 10 year limited warranty on compressor and 5 year limited warranty on parts from date of 'start-up'.
   2. Record 'start-up' date on warranty certificate for each unit.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturer:
   1. Manufacturer Contact List:
      a. Carrier Corporation: Carrier National: Steven L. Ament 317-240-2938. steve.l.ament@carrier.utc.com Carrier Utah: Matt Smith 801-224-1020 msmith@mtncom.net.

b. Lennox Industries: For pricing and information call Lennox National Account @ 1-800-367-6285.
c. York International: David E. Carey 405-419-6536 david.e.carey@jci.com.

B. Performance:
1. Capacities: SEER rating as defined by ARI shall be 13.0 or greater.

C. Manufactured Units:
1. Condensing Units:
a. General:
1) Units shall be operable down to 0 deg F (minus 18 deg C) outdoor temperature.
2) Use R-410a refrigerant.
3) Only one liquid line, one suction line, and one power connection shall be made to each compressor. Provide charging valves.
b. Condenser Coils:
1) Aluminum plate fins mechanically bonded to seamless copper tubes or 'Spine Fin' trade mark system which has aluminum fins epoxy bonded to aluminum tubes or micro-channel.
2) Provide stamped louver coil guard for unit.
c. Fans:
1) Direct driven propeller type.
2) Fan motor shall be single or two speed, thermostatically controlled, permanently lubricated, and designed with permanent protection.
3) Motors shall be resiliently mounted.
4) Each fan shall have a safety guard.
d. Compressor:
1) Each condenser unit shall have only one compressor.
2) Design with following features:
a) Externally mounted brass service valves with charging connections.
b) Crankcase heater.
c) Resilient rubber mounts.
d) Compressor motor-overload protection.
e) Single speed.
e. Controls:
1) Factory wired and located in separate enclosure.
2) Following three paragraphs may not be factory installed and will therefore have to be field installed.
3) Safety devices:
a) High and low pressure cutout.
b) Condenser fan motor-overload devices.
4) Anti-cycle timers to prevent units from starting up again for five minutes after any power interruption.
5) Head pressure type low ambient kit.
f. Casing:
1) Fully weatherproof for outdoor installation. Finish shall be weather resistant.
g. Openings shall be provided for power and refrigerant connections.
h. Panels shall be removable for servicing.
i. Approved Products:
1) Standard:
a) Carrier
b) Lennox
c) York
d) Others to be prior approved by engineer prior to bid

2.2 ACCESSORIES

A. Vibration Isolators:
   1. 4 inches (100 mm) square by 3/4 inch (19 mm) thick minimum neoprene type vibration isolation pads.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set condensing units level on concrete slab on vibration isolation pads located at each corner of unit. This does not apply to condensing units that have a composite non-metal bottom.

B. Do not use capillary tube and piston type refrigerant metering devices.

3.2 FIELD QUALITY CONTROL

A. Manufacturer Services:
   1. Condensing units shall be started up, checked out, and adjusted by condensing unit installer.
   2. Use equipment checkout sheet provided by Manufacturer. Complete and sign all items on sheet.

END OF SECTION

END OF DIVISION 23

DIVISION 26: ELECTRICAL

END OF TABLE OF CONTENTS

SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
   3. Make electrical connections to equipment provided under other Sections.
   4. Furnish and install Penetration Firestop Systems at electrical system penetrations as described in Contract Documents.

B. Products Furnished But Not Installed Under This Section:
   1. Anchor bolts and templates for exterior lighting equipment bases.

C. Related Requirements:
   1. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, 'National Electrical Code (NEC)' (2017 or most recent edition adopted by AHJ).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250-2018, 'Enclosure for Electrical Equipment (1000 Volts Maximum)'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 2816: 'Enclosed Switches And Circuit Breakers'.
      c. Do not purchase equipment before approval of product data.
   2. Shop Drawings:
      a. Submit on Panelboards:
      b. Indicate precise equipment to be used, including all options specified. Indicate wording and format of nameplates where applicable. Submit in three-ring binder with hard cover.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Report of site tests, before Substantial Completion.
   2. Qualification Statement:

a. Electrical Subcontractor:
   1) Provide Qualification documentation if requested by Engineer or Owner.
b. Installer:
   1) Provide Qualification documentation if requested by Engineer or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Operations and Maintenance Data:
      1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
   b. Record Documentation:
      1) Manufacturers documentation:
         a) Manufacturer's literature.
         b) Include copy of approved shop drawings.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.
3. Material and equipment provided shall meet standards of NEMA or UL, or ULC, CSA, or EEMAC and bear their label wherever standards have been established and label service is available.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Electrical Subcontractor:
   a. Company specializing in performing work of this section.
      1) Minimum five (5) years experience in electrical installations.
      2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
   b. Upon request, submit documentation.
2. Installer:
   a. Licensed for area of Project.
   b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
   c. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
1. Design Criteria:
   a. Materials and equipment provided under following Sections shall be by same Manufacturer:
      1) Section 26 2417: Panelboards.
      2) Section 26 2816: Enclosed Switches And Circuit Breakers.

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. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

3.3 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Engineer of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Engineer before test. Rectify defects at no additional cost to Owner.
   2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

3.5 CLOSEOUT ACTIVITIES

A. Training:
   1. Provide competent instructor for three (3) days to train Owner's maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

END OF SECTION

SECTION 26 0519

LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of conductors used on Project except as excluded below.

B. Related Requirements:
   1. Section 23 0933: 'Electric and Electronic Control System for HVAC' for conductors and cables for temperature control system.
   2. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Definitions:
   1. Line Voltage: Over 70 Volts.

B. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).
         1) Article 334, "Nonmettalic-Sheathed Cable, Types NM, NMC And NMS'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Line Voltage Conductors:
   1. Copper with AWG sizes as shown:
      a. Minimum size shall be No. 12 except where specified otherwise.
      b. Conductor size No. 8 and larger shall be stranded.
   2. Insulation:
      a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg F (24 deg C)).
      b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg F (24 deg C)).
      c. Higher temperature insulation as required by NFPA 70 or local codes.
   3. Colors:
      a. 208Y / 120 V System:
         1) Black: Phase A.
         2) Red: Phase B.
         3) Blue: Phase C.
         4) Green: Ground.
         5) White: Neutral.
      b. 480Y / 277 Volt System:
         1) Brown: Phase A.
         2) Orange: Phase B.
         3) Yellow: Phase C.
         4) Gray: Neutral.
         5) Green: Ground.

c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.

B. Line Voltage Cables:
1. Non-Metallic Sheathed Cable (NM) and Metal Clad Cable (MC) may be used as restricted below:
a. Copper conductors.
b. Sizes #12 through #8.
c. Use only in indoor dry locations where:
1) Not subject to damage.
2) Not in contact with earth.
d. Not in concrete.
e. Not where exposed or not concealed.
f. Not over suspended ceilings.
g. As restricted by NFPA 70 Article 334.
2. Metal Clad Cable (MC) may be used as restricted below:
a. Copper conductors.
b. Sizes #12 through #8.
c. Use only in indoor dry locations where:
1) Not subject to damage.
2) Not in contact with earth.
3) Not in concrete.

C. Standard Connectors:
1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.
3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Conductors and cables shall be continuous from outlet to outlet.
2. Do not use direct burial cable.

B. Line Voltage Conductors:
1. Install conductors in raceway where indicated on Contract Drawings. Run conductors of different voltage systems in separate conduits.
2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Contract Drawings.
3. Neutrals:
a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
c. Run separate neutrals for each circuit where specifically noted on Contract Drawings.
d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs:
1) Provide breaker tie so that all circuits that share common neutral are simultaneously disconnected.
2) Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
4. Pulling Conductors:

a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
b. Do not use heavy mechanical means for pulling conductors.
c. Use only listed wire pulling lubricants.

C. Line Voltage Cables:
1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
4. Conceal cables within ceilings and walls of finished areas. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
5. Install exposed cables parallel to or at right angles to building structure lines.
6. Keep cables 6 inches (150 mm) minimum from hot water pipes.
7. Do not support cables from mechanical ducts or duct supports without Engineer's written approval.
8. Prohibited procedures:
a. Boring holes for installation of cables in vertical truss members.
b. Notching of structural members for installation of cables.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
   2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.

B. Related Requirements:
   1. See Section 07 8400: 'Firestopping' for raceways penetrating fire rated walls, ceilings, and barriers'.
   2. Section 23 0933: 'Electric and Electronic Control System for HVAC' for concealed raceway and extensions for temperature control system.
   3. Section 26 0501: 'Common Electrical Requirements' for general electrical requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Cooper B-Line, Highland, IL www.b-line.com.
      b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
      c. Square D, Palatine, IL www.squared.com.
      d. Thomas & Betts, Memphis, TN www.tnb.com or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
      e. Walker Systems Inc, Williamstown, WV (800) 240-2601 or Walker Systems Inc / Wiremold Canada Inc, Fergus, ON (519) 843-4332.
      f. Wiremold Co, West Hartford, CT www.wiremold.com.

B. Materials:
   1. Raceway And Conduit:
      a. Sizes:
         1) 3/4 inch (19 mm) for exterior use, unless indicated otherwise.
         2) 1/2 inch (13 mm) for interior use, unless indicated otherwise.
      b. Types: Usage of each type is restricted as specified below by product.
         1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.

2) Galvanized Electrical Metallic Tubing (EMT), Flexible Steel Conduit, and Electrical Non-Metallic Tubing (ENT):
   a) Allowed for use only in indoor dry locations where it is:
      (1) Not subject to damage.
      (2) Not in contact with earth.
      (3) Not in concrete.
   b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
3) Galvanized Electrical Metallic Tubing (EMT) and Flexible Steel Conduit:
   a) Allowed for use only in indoor dry locations where it is:
      (1) Not subject to damage.
      (2) Not in contact with earth.
      (3) Not in concrete.
   b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
4) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
   a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
5) Listed, Liquid-Tight Flexible Metal Conduit:
   a) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches (900 mm).
6) Pre-wired 3/8 Inch (9.5 mm) Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches (1 800 mm).

c. Prohibited Raceway Materials:
   1) Aluminum conduit.
   2) Armored cable type AC (BX) cable.

2. Raceway And Conduit:
   a. Sizes:
      1) 3/4 inch (19 mm) for exterior use, unless indicated otherwise.
      2) 1/2 inch (13 mm) for interior use, unless indicated otherwise.
   b. Types: Usage of each type is restricted as specified below by product.
      1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
      2) Galvanized Electrical Metallic Tubing (EMT), Flexible Steel Conduit, and Metal Clad Cable (MC):
         a) Allowed for use only in indoor dry locations where it is:
            (1) Not subject to damage.
            (2) Not in contact with earth.
            (3) Not in concrete.
         b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
      3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
         a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
      4) Listed, Liquid-Tight Flexible Metal Conduit:
         a) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches (900 mm).
      5) Pre-wired 3/8 Inch (9.5 mm) Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches (1 800 mm).
   c. Prohibited Raceway Materials:
      1) Aluminum conduit.
      2) Armored cable type AC (BX) cable.

3. Raceway And Conduit Fittings:
   a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
   b. EMT:
      1) Compression type.
      2) Steel set screw housing type.

c. PVC Conduit:
   1) PVC type. Use PVC adapters at all boxes.
   2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
d. Flexible Steel Conduit: Screw-in type.
e. Liquid-tight Flexible Metal Conduit: Sealtite type.
f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
g. Prohibited Fitting Materials:
   1) Crimp-on, tap-on, indenter type fittings.
   2) Cast set-screw fittings for EMT.
   3) Spray (aerosol) PVC cement.

4. Outlet Boxes:
   a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
      1) Provide metal supports and other accessories for installation of each box.
      2) Equip ceiling and bracket fixture boxes with fixture studs where required.
      3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
   b. HVAC Instrumentation And Control:
      1) Junction boxes in mechanical equipment areas shall be 4 inches (100 mm) square.
      2) Boxes for remote temperature sensor devices shall be recessed single device.
      3) Boxes for thermostats shall be 4 inches (100 mm) square with raised single device cover.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

A. Interface With Other Work:
   1. Coordinate with Divisions 22 and 23 for installation of raceway for control of plumbing and HVAC equipment.
   2. Coordinate with Division 27 for installation of raceway for sound system.
   3. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
      a. Coordinate location of outlet for water coolers with Division 22.
      b. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Engineer and locate outlets under his direction.
   4. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. General:
   1. Sound system electrical components furnished by Division 27 and installed under this Section include following items:
      a. Speaker mounting rings.
      b. Speaker enclosures.

C. Conduit And Raceway:
   1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.

2. Seal all raceways penetrating fire rated walls, ceilings and barriers. See Section 07 8400.
3. Keep raceway runs 6 inches (150 mm) minimum from hot water pipes.
4. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
   a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
   b. Radius of curve shall be at least minimum indicated by NFPA 70.
5. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
6. Install insulated bushings on each end of raceway 1-1/4 inches (32 mm) in diameter and larger, and on all raceways where cables emerge. Install expansion fittings where raceways cross building expansion joints.
7. Run two spare conduits from each new panelboard to ceiling access area or other acceptable accessible area and cap for future use.
8. Bend PVC conduit by hot box bender and, for PVC 2 inches (50 mm) in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
9. Installation In Framing:
   a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
   b. Holes shall be one inch (25 mm) diameter maximum.
10. Underground Raceway And Conduit:
   a. Bury underground raceway installed outside building 24 inches (600 mm) deep minimum.
   b. Bury underground conduit in planting areas 24 inches (600 mm) deep minimum. It is permissible to install conduit 6 inch (150 mm) below concrete sidewalks, however, conduit must be buried 24 inches (600 mm) deep at point of exit from planting areas.
11. Conduit And Raceway Support:
   a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
   b. Do not support from mechanical ducts or duct supports without Engineer's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
      1) Expansion shields in concrete or solid masonry.
      2) Toggle bolts on hollow masonry units.
      3) Wood screws on wood.
      4) Metal screws on metal.
12. Prohibited Procedures:
   a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
   b. Installation of raceway that has been crushed or deformed.
   c. Use of torches for bending PVC.
   d. Spray applied PVC cement.
   e. Boring holes in truss members.
   f. Notching of structural members.
   g. Supporting raceway from ceiling system support wires.
   h. Nail drive straps or tie wire for supporting raceway.

D. Boxes:
1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
7. Location:

a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Contract Drawings. Verify door swings shown on electrical drawings with Mechanical drawings, and report discrepancies to Engineer before rough-in. Distance of box from jamb shall be 6 inches (150 mm) from door jamb.
b. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.
c. Center ceramic tile boxes in tile.

END OF SECTION

SECTION 26 2417

CIRCUIT-BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install circuit-breaker panelboards as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70E: 'Standard for Electrical Safety in the Workplace' (2018 or most recent edition adopted by AHJ).

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Cutler-Hammer Inc, Pittsburgh, PA www.eatonelectric.com.
      b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
      c. Siemens Energy & Automation, Alphrata, GA www.sea.siemens.com.
      d. Square D Co, Palatine, IL www.us.squared.com.

B. Performance:
   1. Capacities:
      a. Panelboard:
         1) Minimum integrated equipment short circuit rating of 22,000 amperes for 120 / 208 Volts.
         2) Minimum integrated equipment short circuit rating of 50,000 amperes for 277 / 280 Volts.
         3) Rated for use as service entrance equipment.
      b. Lighting And Appliance Panelboards:
         1) Minimum integrated equipment short circuit rating of 10,000 amperes for 120 / 208 Volts.
         2) Minimum integrated equipment short circuit rating of 14,000 amperes for 277 / 480 Volts.
      c. Load Centers:
         1) 125 Amp main lugs, 120 / 208 Volt, three-phase.
         2) Minimum integrated equipment short circuit rating of 10,000 Amps.

C. Material:
   1. Circuit-breaker type.
   2. Galvanized steel cabinets
   3. Bussing and lugs arranged as required.

4. Multi-pole circuit-breakers shall be common trip.
5. Circuit-breakers shall be molded case thermal magnetic type with inverse time characteristics.
6. Lighting And Appliance Panelboards:
   a. Plug-on or bolt-on breakers. Multi-pole breakers shall be common trip.
   b. Factory installed or provided circuit number identification for each breaker and space.
   c. Cabinets shall be locking type with no exposed latches or screws when door is closed. Key panels alike and provide minimum of three keys.
   d. Minimum dimensions of 20 inches (500 mm) wide by 5-3/4 inches (146 mm) deep.
   e. Space designation on Drawings indicates bus hardware and panelboard capacity for future acceptance of one 20 Amp, single-pole circuit-breaker.
   f. Breakers specified to be shunt trip and shall include shunt trip accessories to remotely trip breaker using separate 120 V power source. Trip coil shall include coil-clearing contact to break coil current when breaker opens.
   g. Use equipment from same manufacturer as main panelboard.
   h. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Type PRL1a by Cutler-Hammer.
      2) Type AL or AQ by General Electric.
      3) Type P1 by Siemens.
      4) Type NQOD by Square D.
7. Load Centers:
   a. Surface-mounted, outdoor NEMA Type 3R enclosure with padlocking provisions. 12-1/2 inches (318 mm) wide by 4-1/2 inch (115 mm) deep minimum.
   b. HACR type circuit breakers.
   c. Use equipment from same manufacturer as main panelboard.
   d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Type CH by Eaton.
      2) Type PowerMark Plus by General Electric.
      3) Type PL by Siemens.
      4) Type QO by Square D.
8. Labels:
   a. All Switchboards shall be labeled with Arc-Flash Hazard Information per NFPA 70E 130.5 including:
      1) Nominal system voltage.
      2) Arc flash boundary.
      3) Available incident energy.
      4) Working distance.
      5) Minimum arc rating of clothing.
      6) Level of PPE.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine wall framing and verify framing for proper spacing for installation of panelboard(s).
      a. Notify Engineer of improper spacing in writing.

B. Contractor shall be responsible for performing required calculations to determine ARC Flash Hazards and providing all appropriate labeling per NFPA 70E.

3.2 INSTALLATION

A. Label panelboards, load centers, and each breaker in main panelboard with 1/16 inch (1.6 mm) thick laminated plastic composition material with contrasting color core. Engraved letters shall be 1/4 inch (6 mm) high.

B. Provide typewritten circuit schedules in lighting and distribution panelboards and load centers to identify panelboard and load served by each branch breaker.

C. Arrange conductors neatly within panelboards and load centers.

D. Secure to structure in accordance with requirements of Project seismic design category.

3.3 PROTECTION

A. Protect panelboards, load centers, and interior components from paint, gypsum board compound, dirt, dust, and other foreign matter during construction.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wiring devices complete with plates as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Cooper Wiring Devices, Peachtree City, GA www.cooperwiringdevices.com.
      b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
      c. Hubbell Building Automation, Austin, TX www.hubbell-automation.com.
      d. Hubbell Inc, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (800) 263-4622 or (905) 839-4332.
      e. Hunt Control Systems Inc, Fort Collins, CO www.huntdimming.com.
      f. Intermatic Inc, Spring Grove, IL www.intermatic.com.
      g. IR-TEC America, Inc., Brea, CA www.irtec.com/en-ira/.
      h. Leviton Manufacturing Co, Little Neck, NY www.leviton.com or Leviton Manufacturing of Canada Ltd, Pointe-Claire, QB (800) 461-2002 or (514) 954-1840.
      i. Legrand, West Hartford, CT www.legrand.us.com or Vaughan, ON www.legrand.ca.com.
      j. Lutron Electronics Co Inc, Coopersburg, PA www.lutron.com.
      k. Ortronics, New London, CT www.ortronics.com.
      l. Paragon Electric Co Inc, Carol Stream, IL www.icca.invensys.com/paragon or Paragon Electric, Mississauga, ON (800) 951-5526 or (905) 890-5956.
      m. Pass & Seymour, Syracuse, NY www.passandseymour.com or Pass & Seymour Canada Inc, Concord, ON (905) 738-9195.
      n. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
      o. Red Dot div of Thomas & Betts, Memphis, TN www.tnbcom.
      p. Schneider Electric North America, Palatine, IL www.schneider-electric.com (847) 397-2600.
      q. Sensorswitch, Wallingford, CT www.sensorswitch.com.
      r. Siemon Company, Watertown, CT www.siemon.com.
      s. Square D Co, Palatine, IL www.squared.com.
      t. Suttle, Hector, MN www.suttleonline.com.
      u. Tork Inc, Mount Vernon, NY www.tork.com.
      v. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
   2. Product Options:
      a. Faces shall be nylon where available.
      b. Devices of single type shall be from same Manufacturer.
      c. Devices are listed as white. Use white devices on light colored walls, brown on dark colored walls, and black on black walls.

B. Switches:
   1. Furnace Disconnect:
      a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) 20 AMP, single pole:
            a) Cooper: 2221V.
            b) Hubbell: HBL1221-I.
            c) Pass & Seymour: 20AC1-I.
            d) Leviton: 1221-2I.

C. Receptacles:
   1. Standard Style:
      a. 15 AMP, specification grade, back and side wired, self grounding, tamper resistant.
      b. Verified by UL to meet Fed Spec WC-596F.
      c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) Cooper: TR5262.
         2) Hubbell: BR20.
         3) Leviton: TBR20.
         4) Pass & Seymour: TR20.
   2. Ground Fault Circuit Interrupter (GFCI):
      a. 15 AMP, specification grade.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) Cooper: GF15W.
         2) Hubbell: GF5252WA.
         3) Leviton: 8599-W.
         4) Pass & Seymour: 1594-W.

D. Plates:
   1. Standard Cover Plates:
      a. Office / Occupied Areas:
         1) Nylon or high impact resistant thermoplastic.
         2) Color shall match wiring device.
      b. All Other: Steel.
      c. Ganged switches shall have gang plates.
      d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
         1) Cooper.
         2) Hubbell.
         3) Leviton.
         4) Pass & Seymour.
   2. Weatherproof In-Use Receptacle Covers:
      a. NEMA 3R rated.
      b. Cast aluminum.
      c. Compatible with GFCI receptacles.
      d. Complete with weather resistant gaskets and stainless steel screws.
      e. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) Hubbell: WP26MH, horizontal; WP26M, vertical.
         2) Intermatic: WP1010HMC, horizontal; WP1010MC, vertical.
         3) Red Dot: CKMG, horizontal; CKMGV, vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices flush with walls, straight, and solid to box.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install disconnects as described in Contract Documents, except those provided integral with equipment.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Disconnects: Same as Manufacturer of Project's main panelboard.
      b. Fuses.
         1) Cooper Bussmann, Ellisville, IL www.cooperbussmann.com.
         2) Edison Fuse, Ellisville, IL (314) 391-3443.
         3) Ferraz Shawmut, Newburyport, MA www.ferrazshawmut.com.
         4) Littelfuse Inc, Des Plaines, IL www.littelfuse.com.

B. Disconnects:
   1. Heavy-duty quick-make, quick-break type, non-fused unless indicated otherwise.
   2. Provide interlock to prevent opening of door when switch is in ON position.
   3. Provide means to lock switch in OFF position with padlock.
   4. Disconnects for motor circuits shall be horsepower rated.
   5. Disconnects For Furnace Units And Unit Heaters: Provide manual starter with thermal overload relay. Provide overload relay to match motor full load amps.
   6. Enclosures:
      a. Interior: NEMA / CEMA Type 1.
      b. Exterior: NEMA / CEMA Type 3R.
   7. Fuses:
      a. Fuse fused disconnects with dual-element time delay fuses and equip with rejection type fuse holders.
      b. Fuses on Project shall be from single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Label disconnects to indicate equipment served, such as Condensing Unit CU-1. Use 1/16 inch (1.6 mm) thick laminated plastic composition material with contrasting color core. Engraved letters shall be 1/4 inch (6 mm) high. Attach labels with screws.

B. Install furnace disconnects on furnace at location where it is accessible from front of unit and it does not interfere with unit's operation.

END OF SECTION
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