DIVISION 02: EXISTING CONDITIONS

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SECTION 02 4119

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements' for salvage of existing electrical items to be reused or recycled removed by Owner.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2013 Edition.
   2. American Society of Safety Engineers:
      a. ASSE A10.6-2006, 'Safety Requirements for Demolition Operations'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Storage or sale of removed items or materials will not be permitted on-site.

B. Pre-Installation Conference:
   1. Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.

C. Scheduling:
   1. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, on Schedule specified in Section 01 3200.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Special Procedure Submittals:
      a. Inventory:
         1) After selective demolition is complete, submit list of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with governing EPA notification regulations before beginning selective demolition.
   2. Comply with hauling and disposal regulations of authorities having jurisdiction.
   3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 FIELD CONDITIONS

A. Existing Conditions:
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
      a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Evaluation And Assessment:
   1. Hazardous Materials:
      a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
      b. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
   2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.
   3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
   4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
   5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

A. Temporary Facilities:
   1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   2. Maintain fire-protection facilities in service during selective demolition operations.

B. Temporary Shoring:
   1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   2. Strengthen or add new supports when required during progress of selective demolition.

C. Utility Services:
   1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
      a. Arrange to shut off indicated utilities with utility companies.

b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 SELECTIVE DEMOLITION

A. General:
1. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
2. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   d. Maintain adequate ventilation when using cutting torches.
   e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   h. Dispose of demolished items and materials promptly.

B. Selective Demolition Procedures For Specific Materials:
1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
2. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
3. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Removed and Salvaged Items:
1. Relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
   a. Clean salvaged items as directed by Owner.
   b. Pack or crate items after cleaning. Identify contents of containers.
   c. Store items in a secure area until delivery to Owner.
   d. Transport items to Owner's storage area designated by Owner.
   e. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain:
   1. Protect construction indicated to remain against damage and soiling during selective demolition.
   2. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 CLEANING

A. General:
   1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
   2. Return adjacent areas to condition existing before selective demolition operations began.

B. Waste Management:
   1. Disposal of Demolished Materials:
      a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
         1) Do not allow demolished materials to accumulate on-site.
         2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
         3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

END OF SECTION

DIVISION 03: CONCRETE

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SECTION 03 1113

STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

1.3 ADMINISTRATIVE REQUIREMENTS

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

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

1.4 SUBMITTALS

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

PART 2 - PRODUCTS

2.1 COMPONENTS

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

2.2 ACCESSORIES

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

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

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

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

3.2 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Concrete Formwork:
      a. Inspections are not required and will be performed at discretion of Architect.

END OF SECTION

SECTION 03 1511

CONCRETE ANCHORS

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Inspection shall be performed according IBC requirements.
   2. Notify Testing Agency and Architect one week before installing anchors so inspection may be scheduled.

1.4 SUBMITTALS

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

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

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

1.5 QUALITY ASSURANCE

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

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Anchors:
   1. General:
      a. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
      b. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch (6.4 mm) by 3 inch (76 mm) x 3 inch (76 mm) minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
      c. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
      d. Conform to requirements of ASTM F3125/F3125 for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
   2. Threaded rod for adhesive anchors and cast-in anchors:
      a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
   3. Cast-In-Place Anchor Bolts:
      a. J-Bolts:
         1) Non-headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
         2) Anchor hook to project 2 inches (50 mm) minimum including bolt diameter.
      b. Headed Bolts:
         1) Headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
   4. Reinforcing Bars:
      a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60.
   5. Adhesive Anchors:
      a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC308 for concrete.
      b. Rod diameter and embedment length as indicated on Contract Drawings.
      c. Type Two Acceptable Products:
         1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
         2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
         3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
         4) Equal as approved by Architect before installation. See Section 01 6200.
   6. Expansion Anchors:
      a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC193 for concrete.
      b. Type Two Acceptable Products:
         1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
         2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
         3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
         4) Equal as approved by Architect before installation. See Section 01 6200.
   7. Screw Anchors:

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION

A. Post-Installed Anchors:
1. General:
a. Drill holes with rotary impact hammer drills using carbide-tipped bits.
b. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
c. Perform anchor installation in accordance with Manufacturer's published instructions.
2. Adhesive Anchors:
a. Clean holes in accordance with Manufacturer's published instructions before installation of adhesive:
1) Follow Manufacturer's recommendations to ensure proper mixing of adhesive components.
b. Adhesive:
1) Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.
2) Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
3) Remove excess adhesive from surface and threads of anchor as necessary.
c. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
d. Temperature:
1) Observe Manufacturer's recommendations with respect to installation temperatures for adhesive anchors.
2) Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.

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

3.4 FIELD QUALITY CONTROL

A. Field And Inspections:
   1. Civil and structural field inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
      a. Quality Control is sole responsibility of Contractor.
         1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
            a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
   2. Expansion Anchors / Adhesive Anchors / Screw Anchors:
      a. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
      b. Inspections:
         1) Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
            a) The correct rod/anchor is used; size and type.
            b) The correct hole size is used and prepared per Manufacturer's instructions.
            c) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
            d) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
            e) Torque applied to anchors does not exceed Manufacturer's allowable limits.
            f) Torque applied to anchors is per Manufacturer's instructions.

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

3.5 CLEANING

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

3.6 PROTECTION

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

END OF SECTION

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SECTION 03 2100

REINFORCEMENT BARS

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

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

1.3 ADMINISTRATIVE REQUIREMENTS

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

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

1.4 SUBMITTALS

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

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

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

1.5 QUALITY ASSURANCE

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

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

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 MATERIAL

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

2.2 ACCESSORIES

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

2.3 FABRICATION

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

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

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

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

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

3.2 FIELD QUALITY CONTROL

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

END OF SECTION

SECTION 03 3111

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

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

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

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

1.2 REFERENCES

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

B. Definitions:
   1. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F (4.4 deg C) in twenty-four (24) hour period.
   2. Floor Flatness (F_F): Rate of change in elevation of floor over 12 inches (305 mm) section.
   3. Floor Levelness (F_L): Measures difference in elevation between two points which are 10 feet (3.05 m) apart.
   4. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F (38 deg C) or ambient air temperature above 90 deg F (32 deg C) with wind velocity 8 mph (12.9 kph) or greater.

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

1.3 ADMINISTRATIVE REQUIREMENTS

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

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

1.4 SUBMITTALS

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

e. Show all formwork for concrete surfaces which are to remain exposed in the finished work.

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

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

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

1.5 QUALITY ASSURANCE

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

B. Testing And Inspection:
1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Testing and Inspection on concrete:

a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:
   1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
   2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 SYSTEM

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

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

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

2. Aggregates:
   a. General:
      1) Submit a letter on quarry's letterhead that certifies all aggregate for concrete complies with the requirements of this section. Material certificates which are submitted shall be signed by both the materials producer and the contractor, certifying that materials comply with or exceed requirements specified herein to the Architect, Civil and Structural Engineering Consultant and the Independent Testing Laboratory for review and approval.
      2) Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.
   b. Coarse:
      1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
      2) Aggregate shall be uniformly graded by weight.
   c. Fine:
      1) Meet requirements of ASTM C33/C33M.
      2) Aggregate shall be uniformly graded by weight.
3. Water: Clear, apparently clean, and potable.
4. Admixtures And Miscellaneous:
   a. Fly Ash:
      1) Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.
   b. Chemical:
      1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
      2) Air Entraining Admixture:
         a) Meet requirements of ASTM C260/C260M.
         b) Type Two Acceptable Products:
            (1) Equal as approved by Architect before use. See Section 01 6200.
      3) Water Reducing Admixture:
         a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
         b) Type Two Acceptable Products:
            (1) Equal as approved by Architect before use. See Section 01 6200.
      4) Water Reducing, Retarding Admixture:
         a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
         b) Type Two Acceptable Products:
            (1) Equal as approved by Architect before use. See Section 01 6200.
      5) High Range Water Reducing Admixture (Superplasticizer):
         a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
         b) Type Two Acceptable Products:
            (1) Equal as approved by Architect before use. See Section 01 6200.
      6) Non-Chloride, Non-Corrosive Accelerating Admixture:
         a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
         b) Type Two Acceptable Products:
            (1) Equal as approved by Architect before use. See Section 01 6200.
      7) Corrosion Inhibiting Admixture:
         a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
         b) Type Two Acceptable Products:
            (1) Eucon CIA by Euclid.
            (2) DCI or DCI-S by GCP Applied Technologies.
            (3) Equal as approved by Architect before use. See Section 01 6200.

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

2.2 ACCESSORIES

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

B. Bonding Agents:
   1. Type Two Acceptable Products:
      a. Acrylic Additive by Bonsal American.
      b. Day Chem Ad Bond (J-40) by Dayton Superior.
      c. Flex-Con by Euclid Chemical Co.
      d. Larsen Weldcrete by Larsen Products Corp.
      e. Everbond by L & M Construction Chemicals.
      f. MasterEmaco A 660 (formally Acryl 60) by BASF.
      g. U S Spec Multicoat by U S Mix Products.

h. Intralok by W R Meadows.
i. Equal as approved by Architect before use. See Section 01 6200.

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.

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

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

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

3.3 INSTALLATION

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

k. Dusting with cement not permitted.

l. Expansion Joints:
1) Install so top of expansion joint material is 1/4 inch (6 mm) below finished surface of concrete.

2) Seal expansion joints as specified in Section 07 9213 for following areas:
a) Between entryway slabs and building foundations.
b) Between sidewalks and building foundations.
c) Within curbs and gutters.
d) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.

3) Expansion joints are not required to be sealed for following areas:
a) Within aprons and where apron abuts sidewalks.
b) Within mow strips and where mow strip abuts building foundation and sidewalks.
c) Within sidewalks.

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

B. Finishing:
1. Vertical Surfaces (Exposed To View Vertical Surfaces, Exposed Retaining Walls, Exposed Foundation Walls, Concrete Piers, and etc.):
a. General:
1) Finishing Material to fill and smooth interior and exterior concrete surface defects such as spalls, gouges, cracks, dents, chips, bug holes, stone pockets, honeycombs, voids and other defective areas.
2) Chamfer lines shall be finished.
b. Surface Preparation:
1) Formwork shall be stripped from concrete while concrete is still 'green'.
2) Concrete surface to be finished immediately after formwork has been removed.
a) Immediately after removing forms, remove joints, marks, bellies, projections, loose materials and other irregularities, and cut back metal ties from surfaces to be exposed.
b) Repair defective areas and voids or stone pockets with Finishing Material and smooth to even surface matching surrounding undamaged area.
c. Smooth Rubbed Finish:
1) Thoroughly wet with water, apply Finishing Material in thin layer, rub in circular motion to smooth uniform finish.
2) Entire surface shall be protected from rapid drying for not less than three (3) days.
3) Surfaces shall be cleaned of drip marks and discolorations.
4) Concrete surface shall be left with clean, neat, uniform finish, free from form markings and shall be uniform in color and texture.

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

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
   a. Quality Control is sole responsibility of Contractor:
      1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
         a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars and Bolts:
   a. Testing Agency shall provide inspections will include following:
      1) Bolts:
         a) Inspection of bolts to be installed in concrete prior to and during placement of concrete.
         b) Periodic inspection of anchors installed in hardened concrete.
      2) Reinforcement Bars:
         a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
         b) Inspect that all reinforcement bars are be positively identified as to heat number and mill analysis.
         c) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.
3. Concrete:
   a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
   b. Testing and inspections, if performed, will include following:
      1) Periodic inspection verifying use of required design mix.
      2) Inspection of reinforcing bars and anchor bolts before placement of concrete for proper installation.
      3) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
      4) Inspection of concrete placement for proper application techniques.
         a) Steel tools are not to be used on exterior concrete.
      5) Periodic inspection for maintenance of specified curing temperature and techniques:
         a) Steel tools are not to be used on exterior concrete. Bull floating and finish floating is to be performed with magnesium or wood floats.
      6) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
         a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
      7) Periodic inspection of concrete finishing operations for proper finishing techniques.
      8) Periodic inspection for placement of specified curing compounds.
   c. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
      1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
         a) Slump: ASTM C143/C143M, test each time set of compressive specimens are made.
         b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
         c) Concrete Temperature: Test each time set of compressive specimens are made.
         d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.
      2) Concrete floor flatness and floor levelness of interior slabs as per ASTM E1155.
      3) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.
   d. Compression Test Specimen: ASTM C31/C31M, one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

e. Compressive Strength Tests: ASTM C39/C39M:
   1) Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd (4 cu m), but less than 50 cu. yd (38 cu m), plus one (1) set for each additional 50 cu. yd (38 cu m) or fraction thereof.
   2) One (1) specimen tested at seven (7) days, two (2) specimens tested at twenty-eight (28) days, and one (1) specimen retained in reserve for later testing if required.
   3) If strength of field-cured cylinders is less than eighty-five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
   4) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi (3.45 MPa).

f. Samples:
   1) Fresh Concrete: ASTM C172/C172M except modified for slump to comply with ASTM C94/C94M.
      a) Slump: ASTM C143/C43M, test each time set of compressive specimens are made.
      b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight.
      c) Concrete Temperature: Test each time set of compressive specimens are made.
      d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.

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

3.5 CLEANING

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

3.6 PROTECTION

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

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

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DIVISION 04: MASONRY

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SECTION 04 0519

MASONRY ANCHORS AND INSERTS

PART 4 - GENERAL

4.1 SUMMARY

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

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

4.2 REFERENCES

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

4.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:

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

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

4.4 SUBMITTALS

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

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

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

4.5 QUALITY ASSURANCE

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

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

4.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

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

PART 5 - PRODUCTS

5.1 MATERIALS

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

B. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
1. Design Criteria:
a. Design loads are determined from testing minimum of five (5) specimens in accordance with ASTM E488 under stresses and conditions that represent intended use.
1) Allowable stress design values are limited to twenty (20) percent of average tested anchor bolt strength.
2) Using strength design provisions, nominal design strengths are limited to sixty-five (65) percent of average tested strength.
b. Effective embedment length: 2 inch (50 mm) minimum.
2. Adhesive Anchors:
a. Cartridge Injection Adhesive Anchors.
b. Products shall have current ICC ES Evaluation report conforming to current ICC ES Acceptance Criteria ICC ES AC 58 for masonry.
c. Rod diameter and embedment length as indicated on Contract Drawings.
d. Type Two Acceptable Products:
1) HIT-HY 70 by Hilti Fastening Systems, Tulsa, OK; www.us.hilti.com.
2) SET Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
3) Equal as approved by Architect before installation. See Section 01 6200.
3. Drilled-In Mechanical Anchors (Expansion Bolts):
a. Products shall have current ICC ES Evaluation report conforming to current ICC ES Acceptance Criteria ICC ES AC 01 for masonry.
b. Type Two Acceptable Products:
1) Kwik Bolt 3 by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Wedge-All by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
3) Equal as approved by Architect before installation. See Section 01 6200.
4. Screw Anchors:
a. Provide anchors with length identification markings conforming to ICC ES AC 106 for masonry.
b. Type Two Acceptable Products:
1) Titen HD by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
2) Equal as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 6 - EXECUTION

6.1 EXAMINATION

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

6.2 PREPARATION

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

6.3 INSTALLATION

A. Post Installed Anchors (Concrete Masonry Unit (CMS) and Hollow Brick Unit Masonry):
   1. General:
      a. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits.
      b. Unless otherwise shown on Contract Drawings, drill holes perpendicular to masonry surface.
      c. Where anchors are to be installed in cored holes, use core bits with matched tolerances specified by Manufacturer. Cores holes may only be used if acceptable to Manufacturer.
      d. Perform anchor installation in accordance with Manufacturer's published instructions.
   2. Adhesive Anchors:
      a. Clean holes in accordance with Manufacturer's published instructions before installation of adhesive. Follow Manufacturer's instructions to ensure proper mixing of adhesive components.
      b. Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive. Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
      c. Remove excess adhesive from surface.
      d. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
      e. Observe Manufacturer's instructions with respect to installation temperatures for adhesive anchors. Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.
   3. Drilled-in Mechanical Anchors (Expansion Bolts):
      a. Protect threads from damage during anchor installation.
      b. Set anchors to Manufacturer's recommended torque, using torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.
   4. Screw Anchors:
      a. Protect threads from damage during anchor installation.
      b. Set anchors to Manufacturer's recommended torque, using torque wrench.

6.4 FIELD QUALITY CONTROL

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

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

6.5 CLEANING

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

6.6 PROTECTION

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

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DIVISION 05: METALS

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SECTION 05 0503

SHOP-APPLIED METAL COATINGS

PART 7 - GENERAL

7.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of factory or shop-applied priming applied to steel supplied to Project without finish coat.
   2. Quality of and procedures for field touch-up and repair of factory-applied priming and galvanizing.

B. Related Requirements:
   1. Section 05 4010: 'Cold-Formed Load-Bearing Metal Framing' for repair to galvanized coatings.
   2. Sections under 09 9000 heading: Finish painting.

7.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A780/A780M-09(2015), ‘Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings'.
      b. ASTM B695-04(2016), 'Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel'.

7.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference.
   2. In addition to requirements of Section 01 3100, review following:
      a. Meet with Architect before commencing repair of galvanized surfaces to establish extent of repairs required and, if applicable, choice of methods to be used.

7.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Product data and samples, if requested by Architect.

PART 8 - PRODUCTS

8.1 FINISHES

A. Factory And Shop-Applied Primer:
   1. Compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.
   2. Primer on unexposed, unfinished surfaces may be fabricator's standard shop coat.

B. Repairs To Primed Surface:

C. Unless otherwise specified, use primer which matches characteristics of original primer and is compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.

D. Material For Repairs Of Galvanized Surfaces:
1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
a. Zinc-Rich Paints:
1) Zinc-Dust Content: Dried film shall contain 94 percent minimum of zinc-dust by weight.
2) Type One Acceptable Manufacturers:
a) Galvax by Alvin Products Inc, Everett, MA www.alvinproducts.com.
b) ZRC Galvilite by ZRC Worldwide, Marshfield, MA www.zrcworldwide.com.
c) Equal as approved by Architect before bidding. See Section 01 6200.
2. Structural, Load-Bearing Items And Items Exposed To Weather:
a. Zinc-Based Solders, Powder, Or Rod:
1) Zinc-Cadmium solder with liquidus temperature range from 518 to 527 deg F (270 to 275 deg C), or
2) Zinc-Tin-Lead alloy with liquidus temperature range from 446 to 500 deg F (230 to 260 deg C).
b. Sprayed Zinc: Wire, ribbon, or powdered zinc suitable for process.

PART 9 - EXECUTION

9.1 PREPARATION

A. Surface Preparation:
1. General:
a. Clean, grind, or otherwise prepare welds in steel that is to be coated within limits acceptable to welder responsible for structural integrity.
b. Surfaces to be coated shall be clean, dry and free of oil, grease, and corrosion products.
2. Preparation Of Primed, Ungalvanized Surfaces:
a. Clean welds and grind serious abrasions.
3. Preparation Of Galvanized Surfaces:
a. Follow requirements of ASTM A780/A780M and following:
b. For Repair Using Zinc-Rich Paints:
1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP10 (1 to 2 mil anchor pattern), as minimum.
2) Where circumstances do not allow blast cleaning, power disk sand to bright metal finish.
3) Extend surface preparation into undamaged galvanized area.
4) Remove flux residue and weld spatter from welded areas.
c. For Repair Using Zinc-Based Alloys:
1) Clean surface to be reconditioned using wire brush, light grinding action, or mild blasting.
2) Extend surface preparation into surrounding, undamaged galvanized areas.
3) Remove flux residue and weld spatter from welded areas.
4) Preheat cleaned area to at least 600 deg F (316 deg C).
a) Do not overheat surface beyond 750 deg F (400 deg C) or allow surrounding galvanized coatings to be burned.
b) Wire brush surface during preheating.
d. For Repair Using Sprayed Zinc (Metallizing):
1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP5 as minimum.
2) Extend surface preparation into undamaged galvanized area.
3) Remove flux residue and weld spatter from welded areas.

9.2 REPAIR / RESTORATION

A. Repairs To Primed, Ungalvanized Surfaces:

1. Thoroughly clean metal and give one (1) prime coat of specified material, well-worked into metal joints and open spaces. Match existing primed finish as required.
   a. Do not apply primer at temperatures below 45 deg F (7 deg C).
   b. Protect un-primed machine-finished surfaces against corrosion by priming.

B. Repairs To Galvanized Surfaces:
   1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
      a. Repair Using Zinc-Rich Paints: Spray- or brush-apply zinc-rich paint to prepared area. Apply paint in single application employing multiple spray passes to achieve dry film thickness of 2 mils.
   2. Structural, Load-Bearing Items And Items Exposed To Weather:
      a. Repair Using Zinc-Based Alloys:
         1) Rub cleaned, pre-heated areas with repair stick to deposit evenly distributed layer of zinc alloy. If powdered zinc alloys are used, sprinkle powder on surface and spread out with spatula or similar tool.
         2) Remove flux residue by rinsing with water or wiping with damp cloth.
      b. Repair Using Sprayed Zinc (Metallizing): Apply 2 mil minimum coating by means of metal-spraying pistols fed with either zinc wire or zinc powder in accordance with requirements of ASTM B695, Type I.
   3. All Items:
      a. Apply repair materials immediately after surface preparation is complete.
      b. Take thickness measurements, with either magnetic or electromagnetic gauge, to ensure applied coating is as specified or agreed to.

END OF SECTION

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SECTION 05 0523

METAL FASTENING

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

1.3 QUALITY ASSURANCE

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

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

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Materials:
   1. Bolts And Threaded Fasteners:
      a. Bolts: Conform to requirements of ASTM A307, Grade A.

PART 3 - NOT USED

END OF SECTION

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SECTION 05 1223

STRUCTURAL STEEL FOR BUILDINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Miscellaneous structural steel:

B. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation of bollards and satellite dish base.
   2. Sections under 04 2000 heading: Installation of lintels, channel frames, and miscellaneous structural steel.
   3. Section 05 0503: 'Shop-Applied Metal Coatings' for quality of priming.
   4. Section 05 0523: 'Metal Fastening' for quality of welding.
   5. Section 06 1100: 'Wood Framing' for installation of miscellaneous structural steel.
   6. Section 09 9113: 'Exterior Painted Galvanized Metal' for preparing and painting new exterior exposed galvanized metal surfaces.

1.2 REFERENCES

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

PART 2 - PRODUCTS

2.1 COMPONENTS

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

B. Fabrication:
   1. After fabrication and before shop priming, hot-dip or mechanically galvanize structural steel

C. Finishes:
   1. Galvanized:
      a. See Section 09 9113 for preparing and painting new exterior exposed galvanized metal surfaces.

PART 3 - EXECUTION: Not Used

END OF SECTION

DIVISION 06: WOOD, PLASTICS, AND COMPOSITES

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SECTION 06 0573

PRESERVATIVE WOOD TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of wood preservative treatment where specified.

B. Related Requirements:
   1. Section 06 1100:
      a. Characteristics of wood to be pressure-treated.
      b. Furnishing and installing of pressure-treated wood.

1.2 REFERENCES

A. Definitions:
   1. Preservative-Treated Wood: Wood exposed to high levels of moisture or heat susceptible to decay by fungus and other organisms, and to insect attack. The damage caused by decay or insects can jeopardize the performance of the wood members so as to reduce the performance below that required. Preservative treatment requires pressure-treatment process to achieve depth of penetration of preservative into wood to verify that the wood will be resistant to decay and insects over time.
   2. Treated Wood: Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects, or marine bores.

B. Reference Standards:
   1. American Wood Protection Association:
      a. AWPA P5-10. 'Standard For Waterborne Preservatives'.
      b. AWPA P22-10. 'Standard For Ammoniacal Copper Zinc Arsenate (ACZA)'.
      c. AWPA P51-10, ‘Standard for Zinc Borate (ZB)’.
      d. AWPA T1-12, ‘Use Category System: Processing and Treatment Standard For Treated Wood’.
      e. AWPA U1-12, ‘Use Category System: User Specification For Treated Wood’.
   2. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
      a. Chapter 23, 'Wood':
         1) Section 2300, 'Minimum Standards and Quality':
            a) 2303.1, ‘General’:
               (1) 2303.1.8, 'Preservative-Treated Wood’.
         2) Section 2400, 'General Construction Requirements':
            a) 2304.11, ‘Protection Against Decay and Termites’:
               (1) 2311.2, 'Wood Used Above Ground’.
               (2) 2311.4, 'Wood In Contact With The Ground'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Certificate: Certificate of pressure treatment showing compliance with specification requirements and including information required under IBC Section 2303.1.8.1, ‘Identification’.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Type One Acceptable Manufacturers:
      a. Arch Wood Protection Inc, Atlanta, GA www.wolmanizedwood.com.
      b. Hoover Treated Wood Products, Thomson, GA www.frtw.com.
      c. Osmose Inc, Griffin, GA www.osmose.com.
      d. U S Borax Inc, Valencia, CA www.borax.com/wood.
      e. Viance LLC, Charlotte, NC www.treatedwood.com.
      f. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance:
   1. Framing lumber grade and species shall be as specified in Section 06 1100 for particular use.
   2. Interior Wood In Contact With Concrete or Masonry:
      a. Preservatives:
         1) Disodium octoborate tetrahydrate (DOT / SBX) meeting requirements of AWPA U1 and with retention of 0.25 lbs per cu ft (4 kg per cu meter).
         2) Zinc borate meeting requirements of AWPA U1 and with retention of 0.17 lbs per cu ft (2.7 kg per cu meter).
         3) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, Georgia, http://www.koppersperformancechemicals.com/ (0.25 lb/cu ft minimum retention).
         4) DURA-GUARD by Hoover Treated Wood Products, Thomson, GA www.frtw.com (.40 lb/cu ft minimum retention).
      b. Lumber: Treat in accordance with AWPA U1.
   3. Exterior Wood Continuously Exposed To Weather:
      a. Preservatives: Waterborne preservatives meeting requirements of AWPA U1 with retention levels as required by AWPA U1 for specific application.
      b. Lumber: Treat in accordance with AWPA U1.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 1011

WOOD FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

1.3 SUBMITTALS

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

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description:
   1. Nail Terminology:

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

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

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

PART 3 - EXECUTION

3.1 ERECTION

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

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

END OF SECTION

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SECTION 06 1100

WOOD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

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

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

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

1.2 REFERENCES

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

B. Reference Standards:

1.3 ADMINISTRATIVE REQUIREMENTS

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

1.4 SUBMITTALS

A. Informational Submittals:
   1. Test And Evaluation Reports:

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

2. Qualification Statements:
   a. Alternate Supplier(s):
      1) Provide name and contact information.
      2) Provide Qualification documentation as requested.

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 SUPPLIERS

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

4) E-Mail: mrunning@shelter-products.com.

2.2 MATERIALS

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

B. Dimension Lumber:
1. Design Criteria:
   a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
   b. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
   c. Lumber 2 inches (50 mm) or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
   d. Preservative Treated Plates / Sills:
      1) 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
      2) 2x6 (38 mm by 140 mm) And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).

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

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

E. See Contract Drawings for additional requirements.

2.3 ACCESSORIES

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

B. Furring Strips:
1. Utility or better.

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Interface With Other Work:
1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.

2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.
3. Posts And Columns:
   a. Unless shown otherwise, nail members of multiple member columns together with 16d at 6 inches (150 mm) on center from each side.
4. Beams And Girders:
   a. Built-Up Members:
      1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
      2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches (300 mm) on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches (300 mm) on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
   b. Pre-Fabricated Members:
      1) Solid glu-lam, LVL, LSL, or PSL members may be used in place of built-up 2x (38 mm) framing members. Size shall be same as built-up member.
      2) Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.
   c. Wood shims are not acceptable under ends.
   d. Do not notch framing members unless specifically shown in Drawing detail.
5. Nailing:
   a. Stud to plate (coordinate with Contract Drawings):

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

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

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

D. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers) for Metal Framing:
   1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
   2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.

E. Furring Strips:
   1. On Wood or Steel: Nail or screw as required to secure firmly.
      a. Ceiling:
         1) Attach furring strips to the underside of structural elements with #8 wood screws, of length to penetrate wood framing 1 inch (25 mm) minimum.
   2. On Concrete or Masonry:
      a. Back up furring strips on exterior walls or walls in contact with earth with 15 lb (6.8 kg) felt strip.
      b. Nail at 12 inches (300 mm) on center maximum.

END OF SECTION

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SECTION 06 1636

WOOD PANEL PRODUCT SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

B. Reference Standards:
   1. International Code Council (IBC) (2018 or latest AHJ approved edition):
      a. IBC Chapter 17, 'Special Inspections And Tests'.

1.3 ADMINISTRATIVE REQUIREMENTS

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

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

1.4 SUBMITTALS

A. Informational Submittals:
1. Qualification Statements:
a. Alternate Supplier(s):
1) Provide name and contact information.
2) Provide Qualification documentation as requested.

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

1.5 QUALITY ASSURANCE

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

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

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

2.2 MATERIALS

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

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

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

2.3 ACCESSORIES

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Wall Sheathing:
1. Spacing:
   a. Provide 1/8 inch (3 mm) space between sheets at end and edge joints.
2. Edge Bearing And Blocking:
   a. Panel edges shall bear on framing members and butt along their center lines.
   b. Back block panel edges, which do not bear on framing members, with 2 inch nominal (45 mm) framing.
3. Nail Spacing:
   a. As indicated on Contract Drawings.
   b. Place nails not less than 3/8 inch (9.5 mm) in from edge.
4. Thickness:
   a. As indicated on Contract Drawings.
5. Do not install any piece of wall sheathing with shortest dimension of less than 12 inches (300 mm).

C. Roof Sheathing:
1. Placing:
   a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
   b. Provide 1/8 inch (3 mm) space between sheets at end and side joints.
   c. Stagger panel end joints.
   d. Sheathing shall be continuous of two spans minimum.
2. Edge Bearing and Blocking:
   a. As indicated on Contract Drawings.
3. Nail Spacing:
   a. As indicated on Contract Drawings.
   b. Place nails at least 3/8 inch (9.5 mm) in from edge.
4. Thickness:
   a. As indicated on Contract Drawings.
5. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches (600 mm) unless support is provided under all edges.

3.2 FIELD QUALITY CONTROL

A. Field Inspections:
1. Sheathing:
   a. General:
      1) Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
      2) Quality Control is sole responsibility of Contractor as specified in Section 01 4523 ‘Testing And Inspection Services’.

b. For walls and roof areas where nail spacing is 4 inches (100 mm) and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

3.3 PROTECTION

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

END OF SECTION

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SECTION 06 1712

STRUCTURAL COMPOSITE LUMBER: SCL

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. Suppliers:
      a. Category Three Approved Supplier(s):
         1) Approval subject to agreement process approval.
      b. Alternate Supplier(s):
         1) Fabricator Firm specializing in performing work of this section.
         2) Provide documentation of the following:
            a) Firm experience in supplying products indicated for this Project.
            b) Financial stability.
            c) Sufficient production capacity to produce required units.
            d) Comply with specifications and Contract Documents.
            e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
         3) Submit documentation to Architect or Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

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

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

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

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

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

PART 3 - EXECUTION: Not Used

END OF SECTION

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SECTION 06 2001

COMMON FINISH CARPENTRY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants required for items installed under this Section, as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Miscellaneous as specified elsewhere.

C. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for furring and blocking.
   2. Section 06 1636: 'Wood Panel Product Sheathing'.
   3. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants, submittal and installation requirements.
   4. Sections under 09 9000 heading: Back priming of work to be installed against concrete or masonry or subjected to moisture, and finishing of finish carpentry and architectural woodwork.

1.2 REFERENCES

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

B. Definitions:
   1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
      a. Economy Grade: The lowest acceptable grade in both material and workmanship requirements, and is for work where price outweighs quality considerations.
      b. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
      c. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.

C. Reference Standards:
   1. ASTM International:
      a. ASTM C578-18, 'Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation'.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Blum Inc, Stanley, NC www.blum.com.
      b. Bommer Industries, Landrum, SC www.bommer.com.

c. CompX National, Mauldin, SC www.nclnet.com.
d. Dow Chemical, Midland, MI www.dow.com.
e. Flynn & Enslow, San Francisco, CA www.flynnenslow.com.
f. Grass America Inc, Kernersville, NC www.grassusa.com.
g. Hafele America Co., Archdale, NC hafele.com.
h. Hillside Wire Cloth Co., Inc., Bloomfield, NJ www.hillsidewirecloth.com.
i. Ives, Indianapolis, IN www.iveshardware.com.
j. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com or Knape & Vogt Canada, Mississaugua, ON (905) 676-8972.
k. Olympus Lock Co, Seattle, WA www.olympus-lock.com.
l. Owens Corning, Toledo, OH www.owens-corning.com.
m. Salice America Inc, Charlotte, NC www.saliceamerica.com.
n. SOSS Door Hardware (Division of Universal Industrial Products Company) Pioneer OH www.soss.com.
o. Stanley, New Britain, CT www.stanleyhardware.com or Oakville, ON (800) 441-1759.
p. TWP Inc., Berkley, CA www.twpinc.com.
q. Wire Cloth Manufacturers Inc., Mine Hill, NJ www.wireclothman.com.

B. Glue: Waterproof and of best quality.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Verify walls, ceilings, floors, and openings are plumb, straight, in-line, and square before installing Architectural Woodwork.
2. Report conditions that are not in compliance to Architect before starting installation.

3.2 PREPARATION

A. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.

3.3 INSTALLATION

A. Special Techniques:
1. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for installation of architectural woodwork.

B. General Architectural Woodwork Installation:
1. Fabricate work in accordance with measurements taken on Project site.
2. Scribe, miter, and join accurately and neatly to conform to details.
3. Exposed surfaces shall be machine sanded, ready for finishing.

C. Installation for Accessories:

D. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.

END OF SECTION

DIVISION 07: THERMAL AND MOISTURE PROTECTION

END OF TABLE OF CONTENTS

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SECTION 07 3113

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

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

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

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

1.2 REFERENCES

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

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

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

2. Canadian Standards Association (CSA Group):
   a. CSA A123.5-16, 'Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules / Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules'.
3. International Building Code (IBC) (2018 Edition or latest edition adopted by AHJ):
   a. Chapter 15, 'Roof Assemblies And Rooftop Structures'.
4. National Fire Protection Association:
   a. NFPA 101: ‘Life Safety Code’ (2015 Edition).
5. Standards Council of Canada:
   a. CAN/ULC-S102:2018, ‘Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.
   b. CAN/ULC-S107:2010-R2017, ‘Methods of Fire Tests of Roof Coverings'.
6. Underwriters Laboratories (UL):
   a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
   b. UL 723, ‘Tests for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
   c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
   d. UL 2218, 'Standard for Impact Resistance of Prepared Roof Covering Materials' (2nd Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference:
      a. Roofing Installer’s Foreman and those responsible for installation of roofing to be in attendance. Include Shingle Manufacturer’s Representative if available.
   2. Schedule pre-installation conference at project site after completion of the installation of roof sheathing but before installation of any roofing system component.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review if Project is in high wind area.
      b. Review if Project could have ice dam problems.
      c. Review 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.
      i. Review Cleaning and Disposal requirements.
      j. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
      k. Review safety issues.

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

g. Apply 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).
h. Primary underlayment.
i. Asphalt shingles.
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. Wind Resistance:
a. Meet ASTM D3161/D3161M for wind resistance.
1) Installation shall comply with IBC Table 1507.2.7, 'Attachment'.
5. Wind Speed:
a. As required to meet local codes having jurisdiction.
6. 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. Roof Installer Workmanship Warranty:
      a. Provide ten (10) year workmanship warranty on roofing system and related components, including flashings, and responsible for all repairs to roofing system and related components due to roof installer’s own negligence or faulty workmanship:

1) In the event that, during ten (10) year period following installation, Roof Installer defaults or fails to fulfill its obligation in relation to workmanship warranty as specified in Manufacturer's Agreement, Manufacturer will assume that obligation for remainder of ten (10) year period following original installation and Owner shall have no obligation to make or pay for repairs to or materials for roofing system that are necessary due to Roof Installer's negligence or faulty installation during that period.

PART 2 - PRODUCTS

2.1 SYSTEM

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

B. Components:
1. Shingles And Underlayment:
a. Fiberglass mat shingles meeting or exceeding requirements of:
1) UL Class A Fire Resistance.
2) ASTM D3018/D3018M, Type I (self sealing).
3) High Wind Areas:
a) ASTM D3161/D3161M UL Class F.
b) ASTM D7158/D7158M UL Class H.
4) ASTM E108 Class A.
5) CSA A123.1/A123.5 (Canada).
6) ASTM D3462/D3462M where required by local codes.
7) Secondary Underlayment: Meet requirements of ASTM D1970/D1970M and UL 790 Class A Fire Resistance.
8) Primary (Synthetic) Underlayment: Meet requirements of ASTM D226/D226M and ASTM D4869/D4869M (physical properties only) or ASTM D1970/D1970M and ASTM E108 Class A Fire.
9) Color as selected by Architect from Shingle Manufacturer's full color line.
b. Category Three Approved Manufactures and Products. See Section 01 6200 for definitions of Categories:
1) CertainTeed:
a) Shingles:
(1) High Wind: Landmark Premium.
(2) Hip And Ridge Shingles: Shadow Ridge or Laminate Accessory for shingle used.
b) Primary Underlayment Under Shingles:
(1) Synthetic Underlayment: Diamond Deck.
c) Secondary Underlayment Under Shingles:
(1) WinterGuard 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) 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) 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) 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

1. Utah Area:
a. Approved Installers:
1) CertainTeed:
2) CertainTeed:
a) AMCO American Roofing Co., Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276.
b) Far West Roofing, Bluffdale, UT – Contact Douglas Cooper (801) 253-7799.
c) Heritage Roofing, Bluffdale, UT – Contact: James Smith (801) 576-8447.
d) Island Heights Construction Inc., Logan, UT – Contact: Casey Ringer (435) 753-7403.
e) JTS Roofing Inc., Ogden, UT – Contact: Todd Shupe (801) 627-6450.
f) Mountain Peak Builders, Inc., Logan, UT – Contact: Zane Rust (435) 787-4174.
g) North Face Roofing, Inc., Park City, UT – Craig Peters (801) 455-8492.
h) Perkes Roofing, Ogden, UT – Contact: Mark Perkes (801) 731-6918.
i) Redd Roofing Co., Ogden, UT – Lance Redd (801) 621-1363.
j) Stout Roofing Inc., St George, UT - Contact: Kelly Casey (435) 635-4288.
k) Stuart Roofing, Ogden, UT, Forest Stuart (801) 394 1923.
l) VIP Roofing, Centerville, UT – Contact: Max Ker (801) 631-6182.
m) White Roofing Co., Nephi, UT – Contact: Charles Shannon White (801) 376-1088.
3) GAF:
a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith Yorgason (801 269-1276.
b) Aspen Roofing, Salt Lake City, UT – Contact: Jon Brady (801) 483-1660.
c) Capital Roofing Service, Inc., Sandy, UT – Contact: Paul Hitzman (801) 562-5568.
d) Fortress Roofing, Murray, UT – Contact: Adam Cordon (801) 509-8625.
e) Knockout Roofing, Riverton, UT – Contact Jared Gran (801) 604-4090.
f) Lifetime Roofing, West Point, UT - Parker Cornably (801) 200-7426.
g) Parrish Construction, American Fork, UT – Contact: Tyler Parrish (801) 787-3633.
h) RSW Plus, Nephi, UT – Contact: Rick White (435) 623-1719.
i) Skyline Roofing Inc., La Verkin, UT - Contact: Adam Stout (435) 635-3172.
j) Wesley Green Roofing, UT – Contact: Scott Horsepool (801) 486-3411.
4) Owens-Corning:
a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276.

3.2 EXAMINATION

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

3.3 PREPARATION

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

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

3.4 INSTALLATION

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

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

C. Underlayment:
   1. General:
      a. Temporary Roof:
         1) Do not use permanent underlayment installation as temporary roof.
         2) If temporary roof is used, remove completely before installation of permanent underlayment.
      b. Follow Shingle Manufacturer's recommendations for installation of primary and secondary underlayment, particularly at eaves, rakes, and penetrations, unless specified installation procedures and Contract Drawing details are more stringent.
      c. Avoid scuffing underlayment that can compromise surface and cause leaking. If scuffing occurs, following Manufacturer's recommendation for repair.
      d. Staples are not permitted.
      e. Weather conditions:

1) Do not leave underlayment exposed to weather more than thirty (30) days after beginning of underlayment installation even if Manufacture allows longer period of time.
2) If underlayment is exposed for more than thirty (30) days after beginning of underlayment installation, treat as temporary roof under first paragraph above.
3) If moisture is deposited on exposed underlayment, obtain written approval from Shingle Manufacturer's Representative before installing shingles.

f. Install valley secondary underlayment, valley primary underlayment, and valley metal after installation of general secondary underlayment, but before installation of general primary underlayment.

2. Primary Underlayment:
   a. Apply 48 inch (1 200 mm) wide courses over complete deck, including areas covered with secondary underlayment unless specified otherwise.
      1) Overlap underlayment before fastening.
      2) Maintain end laps of 6 inch (150 mm) and side laps of 3 inch (76 mm).
      3) Stop primary underlayment between 3 and 6 inches (75 and 150 mm) of inside edge of strip of secondary underlayment installed over edge of formed valley metal.
   b. Nailing Synthetic Underlayment:
      1) Use low-profile plastic or steel cap corrosion resistant nails with 1 inch (25 mm) diameter heads to fasten underlayment in place. (Fastening underlayment without caps is not permitted).
      2) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
      3) Fasteners should be long enough to penetrate at least 3/4 inch (19 mm) into roof sheathing. Fasteners must be lie flush to roof deck at 90 degree angle to roof deck and tight with underlayment.
      4) Do not nail through metal flashing, except drip edge, when installing primary underlayment.
      5) Follow Shingle Manufacturer’s installation instructions for following:
         a) Securing underlayment to roof deck adjusting for roof slope nailing requirements.
         b) Side lap, end lap, and overlapping nailing requirements.
         c) Rake and eave nailing requirements.
         d) High wind condition nailing requirements.
         e) Sealants recommendations.
3. Secondary Underlayment:
   a. Under Shingles:
      1) Lap end joints 6 inches (150 mm) and side joints 3 inch (76 mm) minimum.
      2) Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes before installing drip edge.
      3) Apply multiple courses along eaves and rakes as described in Contract Documents with first course overlapping drip edge and 12 inches (300 mm) wide previously applied strip.
4. Valley Underlayment:
   a. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley lapped to provide 102 inch (2 590 mm) wide covered area centered over valley.
   b. Apply one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
   c. Install formed valley metal over strip of primary underlayment.
      1) Nail top of each section and lap 8 inches (200 mm) in direction of flow.
      2) Seal laps with continuous bead of elastomeric roofing sealant.
      3) Secure edges of valley metal with fasteners spaced at 12 inches (300 mm) maximum on center and approximately 1/2 inch (13 mm) in from edge of metal.
   d. Install 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).

D. Shingles:
1. Before installing shingles, inspect underlayment and metal installation with Architect and Owner. Correct improperly installed and damaged material before beginning shingle installation.
2. Racking installation method is not permitted by Owner and will be considered non-conforming work.
3. Starter shingles:
   a. Manufacturer’s starter shingles are required for Shingle Warranty.
   b. Install shingles at eve and rakes in accordance with Shingle Manufacturer’s instructions.

c. Cut shingles in accordance with Shingle Manufacturer's instructions, or use approved starter course.
d. Nail to eave granule side up in continuous mastic bed with cut edge down-slope and edge overhanging eave 3/8 inch (9 mm) so sealing tabs are at edge of eave.
e. Install shingles with maximum exposure recommended by Shingle Manufacturer.
f. Lay first course directly over starter strip with ends flush with starter strip at eaves and so joints in starter strip are offset 4 inches (100 mm) minimum from joints in first course.

4. Lay shingles so end joints are offset in accordance with Shingle Manufacturer's installation procedures.
5. Insure alignment by snapping chalk line at least each fifth course to control horizontal and vertical alignment.
6. Run courses true to line with end joints properly placed. Leave shingles flat without wave and properly placed.
7. Hip and ridge shingles:
   a. Manufacturer’s hip and ridge shingles are required for Shingle Warranty.
   b. Install specified hip and ridge shingles in accordance with Shingle Manufacturer's instructions.
   c. Run ridge shingles as directed by Architect.
8. Nailing:
   a. General:
      1) Six (6) Nail Pattern as recommended by Shingle Manufacturer for Shingle Warranty in each shingle.
      2) Place in relation to top edge of shingle as required by Shingle Manufacturer.
      3) Place nails one inch (25 mm) from each end of shingle and remainder evenly spaced between.
      4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
   b. Nailing guns:
      1) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
      2) Adjust nail gun pressure for nailing flush and tight to deck without cutting shingle surface.
      3) Drive nails perpendicular to shingle surface so nail head is flat against shingle.
      4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
9. Hand-Sealing:
   a. If ambient temperature or exposure to sun will not be sufficient to secure adhesive strip to under-lying shingle within one week, hand seal shingles with elastomeric roofing sealant.
10. Over valley metal:
    a. Do not drive nails through valley metal.
    b. Run chalk line so valley metal will be exposed 6 inches (150 mm) wide at top and diverge 3/32 inch (one mm) per ft (300 mm) down to eaves.
    c. Neatly trim shingles to this line.
    d. Seal trimmed shingle edges to valley metal with continuous bead of elastomeric roofing sealant applied within one inch (25 mm) of shingle edge.
11. Vent pipe sleeve flange:
    a. Vent pipe sleeve flange as specified in Section 07 6310.
    b. Fit shingles under lower edge and over sides and upper edge.
    c. Set vent pipe flange in elastomeric roofing sealant.
    d. Embed shingles in elastomeric roofing sealant where they overlap flange.
    e. Apply bead of elastomeric roofing sealant at junction of vent pipe and vent flashing.
12. Furnished and installed in Section 07 7226 'Ridge Vents'.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.

2. Raking installation method is not permitted by Owner and will be considered to be not complying with Contract Document requirements and must be corrected at no additional cost to Owner.

3.6 CLEANING

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

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

3.7 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

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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. Section 06 1100: 'Wood Framing' for wood base.
   2. Sections under 07 3000 heading: 'Steep Slope Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
   3. Sections under 07 5000 heading: 'Membrane Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
   4. 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.

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

3.2 CLEANING

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

END OF SECTION

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SECTION 07 6310

STEEP SLOPE ROOF FLASHING: Asphalt Shingles

PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 REFERENCES

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

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-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:
b. NOA (Notice of Acceptance) report.
c. Florida Certificate of Product, Approval.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Pipe Flashing:
a. High Velocity Hurricane Zone (HVHZ)
1) Florida Building Code (FBC):
a) Show compliance with 1626.1, HVHZ – Impact Test for Wind-Bourn Debris' (2014 Code.
b) Submit Notice of Acceptance (NOA) documentation to show compliance.
2) Wind driven rain:
a) Meet Florida Building Code Test Protocol TAS 100-95, 'Test Procedure For Wind And Wind Driven Rain Resistance Of Discontinuous Roof Systems'.
b. Hurricane-Prone Regions and Wind-Borne Debris Region:
1) Florida Certificate of Product:
a) Submit documentation to show compliance.

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. Aluminum: 0.032 inch (0.81 mm) thick minimum.
b. 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. Meet Florida Building Code Test Protocol TAS 100-95, 'Test Procedure For Wind And Wind Driven Rain Resistance Of Discontinuous Roof Systems'.
c. Material warranty of product for life of roof.
3. 24 ga (0.635 mm) coated galvanized steel plate.
4. Minimum 4 inch (100 mm) flashing on each side, 6 inch (150 mm) flashing at top, 3 inch (76 mm) flashing at bottom with nailing slots.
5. UV stable solid molded PVC compression collar.
6. Use Ultimate Pipe Flashing for PVC, ABS and IP.
7. Use Ultimate Pipe Flashing and Easy Sleeve for Copper, Cast Iron, or irregular and damaged pipes:
a. Black PVC with integral cap.
8. Sizes: 1-1/4 inch (32 mm), 1-1/2 inch (38 mm), 2 inch (50 mm), 3 inch (76 mm), and 4 inch (100 mm).
9. Slope: Flat to 18/12 pitch.

10. Flashing Finish: Face coating polyvinyledene Fluoride (PVF_2) Resin-base finish (Kynar 500) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
11. Color: Brown (no other color available).
12. Category Four Approved System Manufacturers. See Section 01 6200 for definitions of Categories:
    a. Ultimate Pipe Flashing by Lifetime Tool & Building Products LLC, Winchester, VA www.lifetimetool.com (877) 904-1002.
    b. Ultimate Pipe Flashing and Easy Sleeve by Lifetime Tool & Building Products LLC, Winchester, VA www.lifetimetool.com (877) 904-1002.

B. Roof Jacks For Metal Flues: Factory-made galvanized steel.

C. Pipe Flashing For Concentric Piping Flashing Retrofitting:
1. Description:
    a. Black EPDM Pipe flashing for existing Concentric Piping for reroofing existing roofs (cutting Concentric Roof Termination cap off and replacing is not permitted).
    b. Weather resistance to withstand ultra violet light and ozone.
    c. Malleable base to conform to different roof pitches.
    d. Pipe size: 1/2 inch (12.7 mm) to 4 inch (101 mm).
        1) On-site customization.
    e. Fasteners included.
2. Type One Acceptable Products:
    a. Aztec RF101BP.
    b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
1. Coordinate with pipe installers for proper size of roof jacks and pipe flashing.

B. Pipe Flashing:
1. Follow Manufacturer's installation instructions.

C. Pipe Flashing For Concentric Piping Flashing Retrofitting:
1. Follow Manufacturer's installation instructions including but not limited to:
    a. Choose appropriate retrofit size.
    b. Wrap pipe flashing around pipe.
    c. Apply 100 percent silicone sealant between base, roof, and top of flashing.
    d. Use fasteners provided.
    e. Apply cable tie as directed.

END OF SECTION

SECTION 07 6311

METAL SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal soffit panel system as described in Contract Documents.

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'.
      c. ASTM B209-14, ‘Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate'.
      d. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet for products furnished.

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

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire Characteristics Performance Requirement:
      a. Meet requirements of ASTM E84 Class A fire rating.

B. Qualifications:
   1. Installer:
      a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Storage And Handling Requirements:
   1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
   2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty against manufacturer defects.
   2. Manufacturer's written thirty five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Type One Acceptable Manufacturers Of Metal:
      a. AEP / Span, Dallas, TX www.aep-span.com.
      b. ATAS Aluminum Products, Allentown, PA www.atas.com.
      c. Fabral, Lancaster, PA www.fabral.com.
      d. Fashion Inc, Ottawa, KS www.fashioninc.com.
      e. Firestone Metal Products, Anoka, MN www.unaclad.com.
      f. MBCI, Houston, TX www.mbci.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 bidding. See Section 01 6200.

B. Performance:
   1. Design Criteria:
      a. Flush panel design.
         1) Panels shall be interlocked full length of panel.
         2) Panel widths shall be Manufacturer's standard.
      b. Performance Standard: ATAS Wind-LOK Soffit MPS120.

C. Materials:
   1. 0.032 inch (0.8 mm) thick minimum 3105-H24 alloy aluminum meeting requirements of ASTM B209.
   2. 24 ga (0.0276 in) (0.7010 mm) galvanized iron or steel meeting requirements of A653/A653M, G 90.
   3. 24 ga (0.0276 in) (0.7010 mm) minimum 50 ksi galvalume steel meeting requirements of ASTM A792/A792M AZ-55.

D. Fabrication:
   1. Panels shall be uniformly dimensioned, roll formed to lengths to avoid trimming.
   2. Panel system shall be anchored as recommended by Manufacturer.
   3. Panels shall be continuous.

E. Finish:
   1. Polyvinyledene Fluoride (PVF_2) Resin-base (Kynar 500 or Hylar 5000) finish for coil coating components containing 70 percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
   2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Fastening Devices: 1-1/2 inch (38 mm) cadmium or zinc plated ring shanked nails.

B. Continuous Soffit Vent:
   1. Type Two Acceptable Products:
      a. Aluminum 8.8 sq in (56.8 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2 inches (50 mm). Color: white or brown.
         1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
      b. Aluminum 9.9 sq in (63.9 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2-1/4 inches (57 mm). Color: white or brown.
         1) Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
      c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate and verify framing is suitable for installation of soffit system.
   2. Notify Architect of unsuitable conditions in writing.
      a. Do not install soffit over unsuitable conditions.
      b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.

B. Isolate from dissimilar metals to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

A. General:
   1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.

B. Waste Management:
   1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

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SECTION 07 6312

PERFORATED METAL SOFFIT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install perforated metal soffit system as described in Contract Documents.

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'.
      c. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.
   2. Military Specifications and Standards:
      a. MIL MIL-DTL-5541F, 'Chemical Conversion Coatings on Aluminum and Aluminum Alloys' (July 2006).

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet for products furnished.

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

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire Characteristics Performance Requirement:
      a. Meet requirements of ASTM E84 Class A fire rating.

B. Qualifications:
   1. Installer:
      a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Storage And Handling Requirements:
1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

A. Manufacturer Warranty:
1. Manufacturer's written 20-year guarantee for finish.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers
1. Type One Acceptable Manufacturers:
a. Alcoa Architectural Products, Eastman, GA www.alcoaarchitecturalproducts.com.
b. Alside Inc, Cuyahoga Falls, OH www.alside.com.
c. ATAS Aluminum Products, Allentown, PA www.atas.com.
d. Gentek Building Products, Akron, OH and Burlington, ON www.gentekinc.com.
e. Kaycan Ltd, Montreal, QB www.kaycan.com.
f. Norandex/Reynolds, Macedonia, OH www.norandexreynolds.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. System 3-12L by Rollex, Elk Grove Village, IL www.rollex.com.
j. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance Requirements:
1. Capacities: Installed soffit system shall meet minimum required structural loading conditions.

C. Materials:
1. 0.019 inch (0.48 mm) thick minimum.
2. 'V' groove design complete with matching trim.
3. Panels shall be interlocked full length of panel.
4. Perforated full width of panel with holes designed so one dimension does not exceed 1/8 inch (3 mm).

D. Finish:
1. Double baked enamel to meet or exceed specifications of MIL-DTL-5541F with protective coating on back side.
2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ASSESSORIES

A. Fastening Devices:
1. 1-1/4 inch (32 mm) galvanized staples or as recommended by Soffit Manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Examine substrate and verify framing is suitable for installation of soffit system.
2. Notify Architect of unsuitable conditions in writing.
   a. Do not install soffit over unsuitable conditions.
   b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.

B. Isolate from dissimilar metals to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

A. General:
   1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.

B. Waste Management:
   1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

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SECTION 07 6322

STEEL FASCIA

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal fascia as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-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'.
      c. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet for products furnished.

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

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire Characteristics Performance Requirement:
      a. Meet requirements of ASTM E84 Class A fire rating.

B. Qualifications:
   1. Installer:
      a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Storage And Handling Requirements:

1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty against manufacturer defects.
   2. Manufacturer's written thirty five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Type One Acceptable Manufacturers Of Metal:
      a. AEP / Span, Dallas, TX www.aep-span.com.
      b. ATAS Aluminum Products, Allentown, PA www.atas.com.
      c. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
      d. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
      e. Fabral, Lancaster, PA www.fabral.com.
      f. Firestone Metal Products, Anoka, MN www.unaclad.com.
      g. Hunter-Douglas Canada Ltd, Brampton, ON www.hunterdouglasgroup.com.
      h. Kaycan Ltd, Montreal, PQ (514) 334-7550 www.kaycan.com.
      i. MBCI, Houston, TX www.mbci.com.
      j. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
      k. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
      l. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com
      m. Ryerson, Chicago, IL www.ryerson.com.
      n. VicWest, Oakville, ON www.vicwest.ca
      o. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials: Minimum 24 ga (0.635 mm), hot-dipped galvanized to meet requirements of ASTM A653/A653M, 1.25 oz/sq ft or galvalume meeting requirements of ASTM A792/A792M AZ50, 50 ksi and complete with accessories recommended by Manufacturer for proper installation.

C. Fabrication: Fascia may either be shop-fabricated using metal from a specified manufacturer, or a factory-fabricated standard system from a specified manufacturer.

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

2.2 ACCESSORIES

A. Fastening Devices: Galvanized steel screws.

B. Continuous Soffit Vent:

1. Type Two Acceptable Products:
   a. Aluminum 8.8 sq in (56.8 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2 inches (50 mm). Color: white or brown.
      1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
   b. Aluminum 9.9 sq in (63.9 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2-1/4 inches (57 mm). Color: white or brown.
      1) Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
   c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate and verify framing is suitable for installation of fascia.
   2. Notify Architect of unsuitable conditions in writing.
      a. Do not install fascia over unsuitable conditions.
      b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Conceal fasteners except where details might require a minimum number to be exposed. Paint heads of exposed fasteners to match background.

B. Install with slip joints at each end. Screw to substrate through pre-drilled, over-size holes.

C. Isolate from dissimilar metals not part of fascia system to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

A. General:
   1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.

B. Waste Management:
   1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

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SECTION 07 7123

MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gutters and downspouts as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealant', for quality of sealants for joints.

1.2 REFERENCES

A. Reference Standard:
   1. Sheet Metal & Air Conditioning Contractors National Association Inc:
      a. SMACNA Architectural Sheet Metal Manual, (7th edition 2012).

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Show gutter cross-section, mounting method, gauge of metal, expansion joint design and locations, and downspout locations minimum.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

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

B. Materials
   1. Steel:
      a. Downspouts: Rectangular, 26 ga (0.0217 inches - 0.5512 mm) galvanized steel including necessary elbows.
      b. Gutters: 24 ga (0.0276 inches - 0.7010 mm) galvanized steel.
      c. Brackets: 22 ga (0.0336 inches - 0.8534 mm) galvanized steel or 26 ga (0.0217 inches - 0.478 mm) double-hemmed minimum.
   2. Screws, Bolts, Nails, And Accessory Fasteners: Non-corrosive and of strength and type consistent with function.

3. Downspouts, gutters, brackets, fasteners, and accessories shall be compatible material.

C. Fabrication:
1. Fabricate in accordance with SMACNA Architectural Manual recommendations, where applicable.
2. Cross-sectional configuration of gutter shall be Style A, (Page 1.13 6th Edition) of SMACNA Architectural Manual.
3. Form accurately to details.
4. Profiles, bends, and intersections shall be even and true to line.

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection Of In-Place Conditions:
1. Before starting work, verify governing dimensions at building. Inspect for conditions that would prevent installation of specified system. Do not install over improper conditions.
2. Insulate work from fascia as necessary to prevent electrolytic action.

3.2 INSTALLATION

A. Allow no more than 40 feet (12 meters) between downspouts. Lap joints in downspouts 1-1/2 inches (38 mm) minimum in direction of water flow.

B. Furnish and install outlet tubes and gutter ends where required. Furnish and install expansion joints in runs exceeding 50 feet (15 meters) and in runs that are restrained at both ends. Lap other joints in gutter one inch (25 mm) minimum, apply sealant in lap, and stainless steel rivet one inch (25 mm) on center maximum.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
1. At completion of this work, block downspouts and flood gutters.
2. Notify Architect two (2) working days before testing.
3. Repair leaks and adjust for proper drainage.

3.4 CLEANING

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

END OF SECTION

SECTION 07 7226

RIDGE VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish ridge vent system and installed under other Sections as described in Contract Documents.

B. Related Requirements:
   1. Section 07 3113: 'Asphalt Shingles' for ridge vent installed over Asphalt Shingle roofing.
   2. Section 07 9213: ‘Elastomeric Joint Sealants’.

1.2 REFERENCES

A. Definitions:
   1. Net Free Area (NFA): Total unobstructed area (adjusted for insect screen, louvers and weather coverings) through which air can pass through a vent; generally measured in square inches. All non-powered vents have a Net Free Area rating.

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-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'.
      c. ASTM C920-18, ‘Standard Specification for Elastomeric Joint Sealants’.
   2. International Building Code (IBC) (2018 or latest adopted edition):
      a. Chapter 12, 'Interior Environment':
         1) Section 1203, 'Ventilation':
            a) 1203.2, ‘Attic Spaces’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference held jointly with Section 07 3113.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Review if Project is in high wind area.
      b. Review Ridge Vent Manufacturers ventilation cutout requirements on roof deck and location of ventilation cutouts shown on Contract Documents.

B. Sequencing:
   1. Coordinate installation with roof membrane.
   2. Installation of ridge vent system.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Instructions:
      a. Design details.
      b. Published ridge vent installation instructions for R&I projects.

c. Storage and handling requirements.

B. Informational Submittals:
1. Certificates:
a. Manufacturer's Certificates of compliance showing products meet or exceed specified requirements.
2. Tests And Evaluation Reports:
a. Manufacturer's test reports.
b. Wind speed coverage for warranted wind speed.
3. Special Procedure Submittals:
a. Contact Owner’s Representative (FM Group or Project Manager) for following information:
1) Installer to include following mandatory information for Warranty Information to be given to Ridge Vent Manufacturer to be added to Manufacturer Warranty included with Closing Submittals:
a) Name of Owner (name of FM Group) _____
b) Mailing Address (FM office address) _____
c) Property ID _____
d) Site address: _____
e) Installation of Ridge Vent (or Roof Completion) Date _____
f) Any addition data required from Ridge Vent Manufacturer.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Final, executed copy of Warranty including Installer project information.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Ridge Vent System:
2. Wind Speed:
a. As required to meet local codes having jurisdiction.

B. Qualifications:
1. Manufacturer:
a. Company specializing in manufacturing products specified with this section with at least five (5) years experience and no known failures of specified product manufactured.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver products job site in original unopened containers or wrappings.
2. Deliver materials in sufficient quantities to allow continuity of work.

B. Storage And Handling Requirements:
1. Storage Requirements:
a. Follow Manufacturer’s instructions and precautions for storage of materials.
b. Protect materials from physical damage in a clean, dry, well vented, and protected location.
2. Handling Requirements:
a. Handle material so as to prevent damage.

1.7 WARRANTY

A. Manufacturer Warranty:
1. General:
a. Ridge vent system will provide calculated net free area (NFA) stated design.
b. Warranty starts at completion of installation.

c. Warranty covers replacement cost excluding labor and any costs involved with repairing or replacing other roofing or building materials.

2. Manufacturer's thirty (30) year warranty covering:
   a. Kynar 500 paint and finish warranty covering color fade, chalk, and film integrity for ridge vent system.
3. Manufacturer's twenty (20) year warranty covering:
   a. Ridge vent system to be free from defects that will affect its performance.
   b. Ridge vent system will withstand winds up to 120 mph (193 kph) average wind speed.
   c. Ridge vent system will withstand snow load.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Three Manufacturers And Products. See Section 01 6200 for definitions of Categories:
      a. Metal-Era Airflow Solutions, Waukesha, WI www.metalera.com.
         1) Contact Information: Alissa Kuether-Bonlender (800) 558-2162 thechurch@metalera.com.
      b. Western Metal Products, LC, Woods Cross, UT www.westernmetalproducts.com.
         1) Contact Information: James Rohletter, phone (888) 298-3454, email rvbid@westernmetalproducts.com.

B. Materials:
   1. Description / Design Criteria:
      a. Ridge Vent:
         1) Basis of Design:
            a) Basis of Design Approved Product:
               (1) HI-PERF High Velocity Ridge Vent by Metal-Era.
            b) Basis of Design Approved Equivalent Product:
               (1) Ridge Vent by Western Metal.
         2) Design Criteria:
            a) Not approved on roof mean heights greater than 33 feet (10 m).
            b) Weather-proof and bug-proof ventilation system.
            c) Withstand winds up to 120 mph (193 kph) average wind speed.
            d) Provide net free area (NFA) requirements as determined by vented roof deck system and eave condition as indicated on Contract Drawings.
         3) Slope to Slope Version:
            a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
               (1) Model HPSS by Metal-Era.
               (2) Model: ASRP2 by Western Metal.
         4) Net free area (NFA): 20 sq. in. per lineal foot.
   2. Components:
      a. Category Four Approved Product:
         1) Basis of design for System Components for this Project is Metal-Era Ridge Vent.
         2) Basis of design approved equivalent system components for this Project is Western Metal.
      b. Ridge vent system comprising of following:
         1) Cover plate 8 inch (200 mm) wide at each joint over ridge vent cover.
         2) Continuous deflector with baffle.
         3) Continuous Z bracket with intermittent spacer at 12 inch (305 mm) on center to supporting ridge cover.
         4) End cap / cover plate.
         5) Expanded metal support screen.
         6) Fasteners.
         7) Intermittent spacers at 12 inch (305 mm) on center directly under ridge vent cover.
         8) Ridge vent cover in 12 feet (3.657 m) length.

c. Metal:
1) 24 ga (0.0276 in) (0.7010 mm) minimum hot-dipped galvanized to meet requirements of ASTM A653/A653M, 1.25 oz per sq ft (381.5 g per sq m) or galvalume meeting requirements of ASTM A792/A792M AZ50.
2) Aluminum: 0.040 inch, 0.050, 0.063 inch.
d. Expanded metal support screen:
1) 0.050 inch (1.27 mm) 3003-H14 formed aluminum with minimum of 48 percent open area.
e. Z brackets: 20 gauge (0.0396 in) (1.0058 mm) G90 galvanized steel.
f. Deflector: 24 ga (0.0276 in) (0.7010 mm) minimum.

C. Finishes:
1. Ridge vent and accessories:
a. Polyvinylidene Fluoride (PV_2) Resin-base finish (Kynar 500) for coil coating components containing seventy (70) percent minimum PVF_2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
b. Approved Color: Medium Bronze.

2.2 ACCESSORIES

A. Ridge Vent System:
1. End Caps, Cover Plates, and other accessories necessary for proper installation.

B. Fasteners:
1. Ridge vent fastened to structure:
a. Category Four Approved Fasteners:
1) Basis of design: Metal-Era Ridge Vent.
2) Basis of design approved equivalent: Western Metal.
b. Fasteners shall be approved by Ridge Vent Manufacturer and provide minimum pull out resistance of 240 lbf (109 kg) into substrate when tested in accordance with TAS 105 test protocol:
1) Screws:
a) #9 1-1/2 inches (38 mm) stainless steel screws.
b) Provided by Manufacturer.
2) Existing Building:
a) #9 1-1/2 inches (38 mm) stainless steel screws.
b) Provided by Manufacturer.
or
c) Fasteners provided by Installer consistent with manufacturer's instructions for each product that is suitable for substrate to which it is being installed.
c. No nailing permitted.

C. Sealant:
1. Description:
a. Weathersealing expansion, contraction, perimeter, and other movement joint sealant.
2. Design Criteria:
a. As specified in Section 07 9213 'Elastomeric Joint Sealants'.
b. Meet following standards for Sealant:
1) ASTM C920: Type S Grade NS, Class 25 (min) Use O.
2) 100 percent silicone.
3. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a. Dow Corning: 790 Silicone Building Sealant.
b. Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
c. Tremco: Tremsil 600 Silicone Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Verify Ridge Vent Manufacturers ventilation cutout requirements on roof deck and location of ventilation cutouts shown on Contract Documents to verify correct location for all cutouts.
      a. Make adjustments to ventilation cutouts if necessary before installation of ridge vent.
   2. Examine deck to determine if it is satisfactory for installation of ridge vent system.
      a. Conditions include, but are not limited to, moisture on deck and protruding deck fasteners.
      b. Verify substrate is dry, clean and free of foreign matter.
   3. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

A. Surface Preparation:
   1. Clean roof sheathing, including removal of dirt, shingle nails, and debris, before installation of ridge vent system.

3.3 INSTALLATION

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

B. Ridge Vent:
   1. Install in accordance with IBC Section 1503.2 'Flashing'.
   2. Install in accordance and as shown with Manufacturer's installation instructions for assembly of components and attachment to roof deck:
   3. Use provided fasteners consistent with manufacturer's instructions, suitable for substrate to which it is being installed.
   4. Attach to roof/wall structure with stainless steel screws provided by Manufacturer at spacing required by Manufacturer. All nail heads and vent section joints shall be sealed with silicone sealant.
   5. Remove protective film before applying sealant.
   6. Apply sealants as per Manufacturer's installation instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 CLEANING

A. General:
   1. Properly clean finished roof surface after completion.

B. Waste Management:
   1. Disposal:
      a. General:
         1) Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

END OF SECTION

SECTION 07 9213

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Removing existing sealants specified in Sections where work required.
   2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

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

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

B. Reference Standards:
1. ASTM International:
a. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
c. ASTM C1330-18, '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.
c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
2. Applicator Qualifications:
a. Company specializing in performing work of this section.
b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

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

C. Mockups:
   1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
      a. Incorporate accepted mockup as part of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver and keep in original containers until ready for use.
   2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:
   1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
   2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
   3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
   4. Do not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

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

1.8 WARRANTY

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

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Dow Corning Corp., Midland, MI www.dowcorning.com.
      b. Franklin International, Inc. Columbus, OH www.titebond.com.
      c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
      d. Laticrete International Inc., Bethany, CT www.laticrete.com.
      e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
      f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
      g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.

h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. Design Criteria:
a. Compliance: Meet or exceed requirements of these standards:
1) ASTM C920: Elastomeric joint sealant performance standard.
2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
b. Comply with Manufacturer's ambient condition requirements.
c. Sealants must meet Manufacturer's shelf-life requirements.
d. Sealants must adhere to and be compatible with specified substrates.
e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.
2. Sealants At Exterior 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) Parapet caps.
b) Wall penetrations.
c) Other joints necessary to seal off building from outside air and moisture.
b. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
3) Color:
a) Architect to select from Manufacturer's standard colors.
b) Match building elements instead of window (do not use white that shows dirt easily).
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning:
a) Primer: 1200 Prime Coat.
b) Sealant: 791 Silicone Weatherproofing Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
a) Primer: SS4044 Primer.
b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
3) Tremco:
a) Primer:
(1) Metal surface: No. 20 primer.
(2) Porous surfaces: No. 23 primer.
b) Sealant: Spectrum 1 Silicone Sealant.
3. Sealants At Exterior Sheet Metal And Miscellaneous:
a. Description:
1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:

a) Flashings.
b) Gutters.
c) Penetrations in soffits and fascias.
d) Roof vents and flues.
e) Lightning protection components.

b. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.

c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning: 790 Silicone Building Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
3) Tremco: Tremsil 600 Silicone Sealant.

2.2 ACCESSORIES

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

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

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

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

3.3 APPLICATION

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

B. Joint Backing:
   1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
   2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.

3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

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

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

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

3.4 TOLERANCES

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

3.5 FIELD QUALITY CONTROL

A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
1. Perform adhesion tests in accordance with Manufacturer’s instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
b. For sealants applied between dissimilar materials, test both sides of joints.
2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

A. Remove masking tape and excess sealant.

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

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

END OF SECTION

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DIVISION 09: FINISHES

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SECTION 09 9001

COMMON PAINTING AND COATING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common procedures and requirements for field-applied painting and coating.

B. Related Requirements:
   1. Section 05 0503: 'Shop-Applied Metal Coatings' for quality of shop priming of steel and iron.
   2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
   3. Sections under 09 9000 heading ‘Paints and Coatings’.
      a. Pre-Installation conferences held jointly with Section 09 9001.

1.2 REFERENCES

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

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

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

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

1.3 ADMINISTRATIVE REQUIREMENTS

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

1.4 SUBMITTALS

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

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

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

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approval:

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

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for both interior and exterior work.
2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
   a. Inspection of painting work shall take place under same lighting conditions as application.
   b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
1. Design Criteria:
   a. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).
   c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.
   d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.

e. Where specified paint system does not have Premium Grade, provide Budget Grade.
f. Provide products of same manufacturer for each coat in coating system.
g. Where required to meet LEED (Leadership in Energy and Environmental Design) program requirements, use only MPI listed materials having an “L” rating designation.
h. Color Levels:
    1) Color Level II:
        a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
        b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.
    2) Color Level III:
        a) Number and placement of interior and exterior paint colors and gloss levels shall be Color Level III from MPI Manual, PDCA P3-93 as modified in following paragraph.
        b) Several paint colors or gloss levels will be selected for same substrate within designated interior rooms or exterior areas.

B. Materials:
1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

PART 3 - EXECUTION

3.1 APPLICATORS

A. Approved Applicators:
1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:
1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.

B. Pre-Installation Testing:
1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.

C. Evaluation And Assessment:
1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.3 PREPARATION

A. Protection Of In-Place Conditions:
   1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
      a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
      b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.
      c. On existing work where ceiling is to be painted, speakers and grilles are already installed, and ceiling color is not being changed, mask off metal grilles installed on ceiling speakers. If ceiling color is being changed, remove metal grilles and paint, and mask off ceiling speakers.

B. Surface Preparation:
   1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
   2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
   3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
   4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
   5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

3.4 APPLICATION

A. Interface With Other Work:
   1. Coordinate with other trades for materials and systems that require painting before installation.
   2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.

B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.
   1. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
      a. Gas pipe from gas meter into building.
      b. Mechanical flues and pipes penetrating roof.
      c. Electrical panel and disconnect enclosures.
      d. Metal protective structures for refrigerant lines.
   2. Metal reveals at ceiling access doors.

C. Apply sealant in gaps 3/16 inch (5 mm) and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.

D. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.

E. Touch up suction spots after application of first finish coat.

F. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.

G. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.

H. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.

I. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
   2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.6 CLEANING

A. General:
   1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

B. Waste Management:
   1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
   2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
   3. Remove debris caused by work of paint Sections from premises and properly dispose.
   4. Retain cleaning water and filter out and properly dispose of sediments.

END OF SECTION

SECTION 09 9112

EXTERIOR PAINTED FERROUS METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting following existing exterior ungalvanized iron and steel surfaces as described in Contract Documents:
      a. Existing iron pipe roof penetrations.

B. Related Requirements:
   1. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.

1.2 ADMINISTRATIVE REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved.

B. Description:
   1. Previously Finished Surfaces: Use MPI(r) REX 5.1K Waterborne Light Industrial Coating.

C. Design Criteria:
   1. Systems specified are in addition to prime coats provided under other Sections of Project Manual.
   2. Finish Requirements: Use MPI Premium Grade finish requirements for work of this Section.
   3. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. All paints and coatings.
      a. Primer Coat: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
      b. Finish Coats: MPI Product 163, ‘Light Industrial Coating, Exterior, Water Based, Semi-Gloss (MPI Gloss Level 5).

PART 3 - EXECUTION

3.1 APPLICATION

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

B. Existing Painted Surfaces:
   1. Remove deteriorated and chalked existing paint and rust down to sound substrate by scraping or power tools.
   2. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying primer coat.
   3. Spot prime bare metal surfaces followed by a prime coat over entire surface to be painted.
   4. Lightly sand entire surface.
   5. Clean surface as recommended by Paint Manufacturer.
   6. Apply specified finish coats.

END OF SECTION

SECTION 09 9113

EXTERIOR PAINTED GALVANIZED METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new exterior exposed galvanized metal surfaces as Described in Contract Documents.
   2. Preparing and painting following existing exterior exposed galvanized metal surfaces as described in Contract Documents.
      a. Roof penetration vents;
      b. Roof penetration flashings;

B. Related Requirements:
   1. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.

1.2 ADMINISTRATIVE REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 SYSTEM

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

B. Description:
   1. All Other:
      a. New Surfaces: Use MPI(a) EXT 5.3H Latex Finish system.
      b. Previously Finished Surfaces: Use MPI(r) REX 5.3H Latex Finish system.

C. Performance:
   1. Design Criteria:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
      c. Sound Existing Surfaces: MPI Custom Grade finish requirements.
      d. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. Polyurethane:
      a. Vinyl Wash Primer Coat: MPI Product 80: ‘Primer, Vinyl Wash’.
      b. Finish Coats:
         1) Epoxy MPI Product 101: ‘Primer, Epoxy, Anti-Corrosive, for Metal’.
         2) Polyurethane MPI Product 72: ‘Polyurethane, Two-Component, Pigmented, Gloss (MPI Gloss Level 6-7)’.

2. Latex:
   a. Waterborne Primer Coat: MPI Product 134: ‘Primer, Galvanized, Water Based’.
   b. Finish Coats: MPI Product 11: ‘Latex, Exterior Semi-Gloss (MPI Gloss Level 5)’.

PART 3 - EXECUTION

3.1 APPLICATION

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

B. New Surfaces:
   1. Clean 'passivated' or 'stabilized' galvanized steel as specified in SSPC-SP1.
   2. After removal of 'passivated' or 'stabilized' coating or for surfaces without coating, clean surfaces to be painted with mineral spirits or product recommended by Paint Manufacturer. Change to clean rags or wiping cloths regularly to reduce possibility of re-contamination of surface.
   3. Apply prime coat.
   4. Apply finish coats.

C. Existing Painted Surfaces:
   1. Remove deteriorated and chalked existing paint and rust deposits down to sound substrate by sanding, scraping, or wire brushing.
   2. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
   3. Apply prime coat.
   4. Apply finish coats.

D. Existing Unpainted Surfaces:
   1. Wirebrush or power wash as necessary to remove 'white rust'.
   2. Apply prime coat.
   3. Apply finish coats.

END OF SECTION

DIVISION 26: ELECTRICAL

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SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Make electrical connections to equipment provided under other Sections.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, 'National 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 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate with Owner for equipment and materials to be removed by Owner.

B. Sequencing:
   1. Include detailed sequence of individual electrical demolition operations on Construction Schedule specified in Section 01 3200.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 0520: 'Heating Cables' for heating cable equipment.
      c. Do not purchase equipment before approval of product data.
   2. Shop Drawings:
      a. Submit on following equipment:
         1) Heating Cables.
      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 Architect or Owner.

b. Installer:
1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Operations and Maintenance Data:
1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
b. Record Documentation:
1) Manufacturers documentation:
a) Manufacturer's literature.
b) Include copy of approved shop drawings.
c) Provide tritium exit sign tabulations for each exit sign installed on Project including following:
(1) Serial number.
(2) Expiration number.
(3) Installed building location (example – chapel north rear exit, north corridor east end, main west foyer, etc.).

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Electrical Subcontractor:
a. Company specializing in performing work of this section.
1) Minimum five (5) years experience in electrical installations.
2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
b. Upon request, submit documentation.
2. Installer:
a. Licensed for area of Project.
b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
c. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
1. Design Criteria:
a. Materials and equipment provided under following Sections shall be by same Manufacturer:
1) Section 26 0520: Heating Cables.

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.

B. Evaluation And Assessment:
   1. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.

3.3 PREPARATION

A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.

B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.

C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.

D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.

E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

3.4 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Architect of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
   2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

3.6 CLEANING

A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

3.7 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 0520

HEATING CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install electric heating cable system for rain gutters and roof eaves as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Rain Gutter and Roof Eaves:
         1) Show layout spacing and cable sizing required by Cable Manufacturer for site conditions. Provide watts per lineal feet at required AC voltage for cable to be used.

B. Informational Submittals:
   1. Qualification Statements:
      a. Installer:
         1) Show Factory Certification if required.

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

1.3 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies but not limited to following:
   1. Installers:
      a. Installer shall be performed by Factory Certified Installer.
      b. Provide documentation if requested by Architect.

1.4 WARRANTY

A. Manufacturer Warranty:
   1. Rain Gutter System:
      a. Manufacturer's ten (10) year warranty covering workmanship and defective materials.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:

a. Bylin Engineered Systems, El Dorado Hills, CA www.bylinusa.com.
b. Easy Heat, East Granby, CT www.easyheat.com or EasyHeat Ltd, Waterloo, ON (800) 794-3766 or (519) 885-2850.
c. Heat Trace Products, LLC. Leominster, MA www.rscc-heattrace.com.
d. Nelson Heat Tracing Systems, East Granby, CT www.nelsonheaters.com.
e. Pass & Seymour, Syracuse, NY or Pass & Seymour Canada Inc, Concord, ON www.passandseymour.com.
f. ProLine, Draper, UT www.prolineradiant.com.
g. Raychem Corporation, Menlo Park, CA www.tycothermal.com or Raychem Canada Ltd, Toronto, ON (800)988-5171 or (416) 234-0886. Raychem sold thru Pentair, Houston, TX www.pentairthermal.com.
h. Square D Co, Palatine, IL www.us.squared.com or Square D Co / Schneider Electric, Toronto, ON (800) 565-6699 or (416) 752-8020.
i. Technitrace Inc, Murray, UT www.technatrace.com.
j. Thermon Manufacturing Co, San Marcos, TX www.thermon.com.
k. Warmquest, Murray, UT www.warmquest.com.
l. WarmZone Inc, Salt Lake City, UT www.warmzone.com.

B. Materials:
1. Rain Gutter And Roof Eave Heaters:
a. Cable:
1) Class One Quality Standard. See Section 01 6200 for quality standard definition:
a) Raychem GM-1X.
b. Temperature And Moisture Sensors:
1) Design Standard:
a) Gutter Sensor: GIT-1 by Raychem.
b) Roof Sensor: CIT-1 by Raychem.
c. Contactor (if required):
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Easy Heat: PC series.
b) Square 'D': Class 8502.
d. Pilot Light:
1) Include plate with engraved text, 'ROOF HEATING CABLE'.
2) Class Two Quality Standard. See Section 01 6200 for quality standard definition:
a) Pass & Seymour 2151 Red.
e. Factory prepared, UL / ULC recognized splice and termination kits by Cable Manufacturer.
f. Controller:
1) Class Two Quality Standard. See Section 01 6200 for quality standard definition:
a) Pertair by Raychem PD Pro for 120V or GF for 200-277V.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Install electric heating cable not to void Roofing Manufacturer system warranty.
2. Provide materials and labor including engineering if required, to prevent and remedy damage to roof integrity.

B. Rain Gutter And Roof Eave Heaters:
1. Install moisture probes for controller in rain gutter and roof.
2. Install pilot light in corridor or foyer to indicate when cables are operating.
3. Terminate raceway on exterior of building at heat cable location with weatherproof junction box.
4. Install cable using approved spacers and without penetrating rain gutter or roofing material.
5. Install all cable, controllers, sensors and etc. per Manufacturer's written installation instructions.

3.2 FIELD QUALITY CONTROL

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

END OF SECTION

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