

- b. Methods and equipment proposed for compaction shall be subject to the prior acceptance by the Owner's representative. Compaction generally shall be done with vibrating equipment. Displacement of, or injury to the pipe and structure shall be avoided. Movement of in-place pipe or structures shall be at the Contractor's risk. Any pipe or structure damaged thereby shall be replaced or repaired as directed by the Landscape Architect and at the expense of the Contractor.

3.8 Testing

- a. Field density test may be ordered by the Landscape Architect for each foot of depth of backfill at an average interval of 200 feet along the trench.
- b. The Contractor shall furnish all necessary samples for laboratory tests and shall provide assistance and cooperation during field tests. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.
- c. Any costs of re-testing required as a result of failure to meet compaction requirements shall be borne by the Contractor.

- C. Work associated with single ply membrane roofing, including (but not limited to) insulation, flashing and counterflashing, expansion joints, and joint sealers, is to be performed by Installer of this work.
 - D. Pre-Roofing Conference: Prior to installation of roofing and associated work, meet at project site, or other mutually agreed location, with installer, roofing sheet manufacturer, installers of related work, and other entities concerned with roofing performance, including (where applicable) Owner's insurer, test agencies, governing authorities, Architect, and Owner. Record discussions and agreements and furnish copy to each participant. Provide at least 72 hours' advance notice to participants prior to convening pre-roofing conference.
 - E. UL Listing: Provide labeled materials that have been tested and listed by UL in "Building Materials Directory" or by other nationally recognized testing laboratory for application indicated, with "Class A" rated materials/system for roof slopes shown.
- 1.5 PROJECT CONDITIONS
- A. Weather: Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.
 - B. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition.

1.6 WARRANTY

- A. Special Project Warranty: Submit two executed copies of 15-year "Roofing Warranty" on form acceptable to Owner, covering work of this section including roofing membrane, composition flashing, roof insulation, and roof accessories, signed and countersigned by Installer (Roofer) and Contractor.
- B. Manufacturer's Warranty: Submit executed copy of single ply membrane manufacturer's "Membrane System Warranty" agreement including flashing endorsement, signed by an authorized representative of manufacturer. Provide form that was published with product literature as of date of Contract Documents, for the following period of time:
 - 1. 15 years after date of Substantial Completion.

2 PART 2 - PRODUCTS

2.1 GENERAL

- A. Performance: Provide roofing materials recognized to be of generic type indicated and tested to show compliance with indicated performances, and are acceptable to manufacturer of primary membrane.
- B. Compatibility: Provide products that are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

- B. Accessory Components: Vented soffits, brake metal clad facias, starter strips and trim as required for a complete installation and as indicated on the Drawings..

3. PART 3 EXECUTION

3.1 INSTALLATION

- A. Install siding and soffits in accordance with manufacturer's instructions.
- B. Install siding for natural watershed.
- C. Align level, and plumb. Locate cut edges and ends over bearing.
- D. Install metal flashings at internal and external corners sills head of wall openings and horizontal joints of sheet materials.
- E. Install corner strips, closures, and trim.
- F. Miter corners of J-channels and window/door trim.
- G. Allow for thermal movement at overlap joints.
- H. Install sealant to prevent weather penetration. Maintain neat appearance.

...END OF SECTION

2.3 ACCESSORIES

- A. Nails: Standard hot dipped zinc coated steel type, of sufficient length to penetrate roof sheathing.
 - B. Plastic Cement: Asphalt type with mineral fiber components.
 - C. Ridge Vent: Continuous preformed ridge ventilator providing not less than 18 sq. in. free area per linear foot
1. Manufacturer/Product: Benjamin Obdyke Inc.; Roll Vent;

2.4 FLASHING MATERIALS

- A. Sheet Flashings: ASTM B209; 0.030 inch thick aluminum.
- B. Drip Edge: 0.030 inch thick aluminum, 5" width.

2.5 FLASHING FABRICATION

- A. Form flashings to profiles indicated on Drawings, and to protect roofing materials from physical damage and shed water.
- B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
- C. Form step flashings with minimum 6" vertical and horizontal legs.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that plumbing stacks and roof penetrations are flashed to deck surface.
- B. Verify deck surfaces are dry, free of ridges, warps, or voids. Broom clean surfaces.
- C. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.

3.2 INSTALLATION - EAVE ICE DAM PROTECTION

- A. Place eave and gable edge metal flashings tight with fascia boards. Weather lap joints and seal with plastic cement. Secure flange with nails.
- B. Apply rubberized asphalt/polyethylene sheet eave protection in accordance with manufacturer's instructions.
- C. Extend eave protection membrane minimum 4 ft upslope beyond interior face of exterior wall.
- D. Extend eave protection membrane a minimum of 18" up face of walls and on roof surface at wall/roof intersections

1. Cafco TPS Mortar.
 2. SpecSeal Fire Rated Mortar SSM
 3. USG Firecode Compound.
- D. Firestopping Material: Single component elastomeric compound.
1. Cafco TPS Type C.
 2. SpecSeal Latex Sealant LC150
 3. 3M Fire Barrier CP 25WB+ Caulk.
 4. USG Smoke-Seal Compound.

2.2 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- B. Dam Material: Permanent
1. As required by manufacturer to meet system listing.

C. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify openings are ready to receive the work of this section.
- B. Clean substrate surfaces of matter which may effect bond of firestopping material.
- C. Install backing materials to arrest liquid material leakage.

3.2 APPLICATION

- A. Apply primer and materials in accordance with manufacturer's instructions.
- B. Apply firestopping material in sufficient thickness to achieve rating, in manner consistent with tested and listed assemblies.
- C. Install material at openings and edge of floor slabs requiring firestopping.
- D. Install material at walls or partition openings which contain penetrating sleeves, piping, duct work, conduit and other items, requiring firestopping.
- E. Protect installed firestopping from damage during construction operations.

...END OF SECTION

2.3 ACCESSORIES

- A. Vapor Retarder: Clear polyethylene film, 6 mil thick.
- B. Tape: Polyester self-adhering type.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

3.2 INSTALLATION - FOUNDATION PERIMETER - BOARD INSULATION

- A. Apply adhesive and install boards on foundation perimeter. Stagger joints. Butt edges and ends tight to adjacent board and to protrusions.
- B. Place insulation boards under slab edge.

3.3 INSTALLATION - BATT INSULATION

- A. Install insulation, ventilation baffles and vapor retarder in accordance with insulation manufacturer's instructions.
- B. Install in exterior walls and ceiling spaces without gaps or voids.
- C. Fit insulation tight in spaces. Leave no gaps or voids.
- D. Install friction fit insulation tight to framing members, completely filling prepared spaces.
- E. Place vapor retarder on warm side of insulation by securing in place. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.

...END OF SECTION

3.2 INSTALLATION

- A. Install work in accordance with AWI Custom quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Install trim by nails.

3.3 PREPARATION FOR FINISH

- A. Sand work smooth and set exposed fasteners. Apply wood filler in exposed fastener indentations.
- B. Site Finishing: Refer to Section 09900.

3.4 SCHEDULE

- A. Exterior:
 - 1. Exposed Wood Trim: White pine, prepare for paint finish.
- B. Interior:
 - 1. Window Sills: Clear white pine, prepare for paint finish.
 - 2. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine, prepare for paint finish.
 - 3. Wall Caps: Red Oak, prepare for transparent finish.

...END OF SECTION

2.03 FABRICATION:

- A. Cut truss members to accurate lengths, angles and sizes to produce close fitting joints with wood-to-wood bearing in assembled units.
- B. Fabricate metal connector plates to size, configuration, thickness and anchorage details required for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce design camber indicated.
- D. Connect truss members by means of metal connector plates accurately located and securely fastened to wood members by means indicated or approved.

PART 3 - EXECUTION**3.01 GENERAL:**

Erect and brace trusses to comply with recommendations of manufacturer and the Truss Plate Institute.

- A. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
- B. Hoist units in place by means of lifting equipment suited to sizes and types of trusses required, applied at designated lift points as recommended by fabricator, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- C. Provide temporary bracing as required to maintain trusses plumb, parallel and in location indicated. TEMPORARY BRACING MUST BE PROVIDED IN THREE DIFFERENT PLANES OF THE TRUSS. BRACING SHALL BE INSTALLED ALONG THE BOTTOM CHORD, ALONG THE TOP CHORD AND WITHIN THE WEB MEMBERS. CONTRACTOR SHALL FOLLOW THE RECOMMENDATIONS OF TPI SUMMARY SHEET HIB-91 FOR HANDLING, INSTALLING AND BRACING METAL CONNECTED WOOD TRUSSES. TEMPORARY BRACING SHALL BE LEFT IN PLACE AND BECOME PART OF THE PERMANENT BRACING FOR THE BUILDING.
- D. Modifications required to the temporary bracing to comply with permanent bracing requirements, if any, shall be noted on the Structural Contract Documents. Install necessary supplemental permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with other indicated requirements.
- E. Anchor trusses securely at all bearing points to comply with methods and details indicated.
- F. Do not cut or remove truss members.

END OF SECTION

- D. Connector Plate Manufacturer's Qualifications: Provide truss connector plates manufactured by a firm which is a member of TPI and which complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Control Manual."
- E. Fabricator's Qualifications: Provide trusses by a firm which has a record of successfully fabricating trusses similar to type indicated and which complies with the following requirements for quality control:
 - 1. Fabricator participates in TPI "Quality Control Inspection Program" as licensee authorized to apply TPI marks to trusses.
- F. Uniformity of Manufacturer for Connector Plates: Provide metal connector plates form a single manufacturer.
- 1.05 SUBMITTALS:
 - A. Submittals shall not be reviewed for conformance by the Architect until such time that all the required items listed below have been received from the Contractor. Non-conformance shall be sufficient reason for rejection of submittal.
 - B. Product Data: Submit fabricator's technical data covering lumber, metal plates, hardware, fabrication process, treatment (if any, handling and erection).
 - 1. Submit certificate, signed by an officer of fabricating firm, indicating that trusses to be supplied for project comply with indicated requirements.
 - C. Shop Drawings: Submit shop drawings, showing species, sizes and stress grade of lumber to be used; pitch, span, camber, configuration and spacing for each type of truss required; type size, material, finish, design value and location of metal connector plates; and bearing and anchorage details.
 - 1. Submit design analysis indicating loading, section modulus, assembled allowable stress, stress diagrams and calculations and similar information needed for analysis and to ensure that trusses comply with requirements. Include effects & loads of mechanical equipment & snow drift loads.
 - 2. Member Bracing: The truss manufacturer shall specify all permanent bracing required for lateral support of tension and compression members.
 - 3. Provide shop drawings and calculations which have been signed and stamped by a Professional Structural Engineer licensed to practice in the State of Maine.
- 1.06 DELIVERY, STORAGE, HANDLING:
 - A. Handle and store trusses with care, and in accordance with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning or other cause for which truss is not designed to resist or endure.
 - B. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

Boise Cascade
Trus Joist MacMillan.

Fb = 2800 ksi E = 2.0×10^6
Fb = 2600 ksi E = 1.9×10^6

- C. Parallel-Strand Lumber: Lumber manufactured by laying up wood strands using an exterior-type adhesive complying with ASTM D 2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:
Boise Cascade Corp.
Trus Joist MacMillan.
- D. Prefabricated Wood I-Joists: Units manufactured by bonding stress-graded lumber flanges to wood-based structural-use panel webs with exterior-type adhesives complying with ASTM D 2559, to produce I-shaped joists complying with the following requirements:
Boise Cascade Corp.
Trus Joist MacMillan.
- E. Sizes: Depths and widths as indicated, with flanges not less than 1-1/2 inches (38 mm) in actual width.

2.04 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners (for wood framing): Hot dipped galvanized steel for exterior high humidity and treated wood locations, electroplated steel elsewhere.
 2. Fasteners (for metal stud framing): Hilti Kwik-Flex or Elco Dri-Flex; no substitutes, 10-24 X 1-1/4 inch wafer head #3
 3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- B. Structural Framing Connectors or Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions, manufactured by Simpson or approved alternate.
- C. Construction Adhesive: APA AFG-01, approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

2.05 FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): AWPA Treatment C1 using water borne preservative with 0.40 percent retainage.

PART 3 EXECUTION

3.01 FRAMING

- A. Set members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

1.03 QUALITY ASSURANCE

- A. AHA (American Hardboard Association) A135.4 – Basic Hardboard.
- B. ALSC (American Lumber Standards Committee) – Softwood Lumber Standards.
- C. ANSI A208.1 – Mat-Formed Wood Particleboard.
- D. APA (American Plywood Association).
- E. AWPA (American Wood Preservers Association) C1-All Timber Products – Preservative Treatment by Pressure Process.
- F. AWPA (American Wood Preservers Association) C20-Structural Lumber Fire Retardant Treatment by Pressure Process.
- G. NELMA (New England Lumber Manufacturer's Association).
- H. NFPA (National Forest Products Association).
- I. RIS (Redwood Inspection Service).
- J. SPIB (Southern Pine Inspection Bureau).
- K. WCLIB (West Coast Lumber Inspection Bureau).
- J. WWPA (Western Wood Products Association).

1.04 SUBMITTALS

- A. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- B. Samples of Exposed To View Wood Members: Submit two samples, 6 inch long, illustrating wood grain, stain, and finish.
- C. Manufacturer's Certificate: Certify that Products conform to specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by NELMA.
 - 2. Plywood Grading Agency: Certified by APA.
- B. In lieu of grade stamping exposed to view lumber and plywood, submit manufacturer's certificate certifying that products meet or exceed specified requirements.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Protect materials from warping or other distortion by stacking to resist movement.

PART 2 PRODUCTS

- B. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. **Cutting, Fitting, and Placement:** Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. **Field Welding:** Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent

3.3 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
1. Use nonmetallic nonshrink grout, unless otherwise indicated.
 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

2.8 STEEL LADDERS

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3.
- B. Siderails: Continuous steel flat bars, 1/2 inch x 2-1/2 inches, with eased edges, spaced 18 inches apart.
- C. Bar Rungs: Square steel bars, 3/4 inch, spaced 12 inches oc.
- D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" oc. by means of welded or bolted steel brackets.
- F. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
- G. Provide non-slip surface on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung which is filled with aluminum oxide grout.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2.11 STEEL PIPE RAILINGS AND HANDRAILS

- A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
- C. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

- f. "Masterflow 713"; Master Builders.
 - g. "Sealtight 588 Grout"; W. R. Meadows, Inc.
 - h. "SonogROUT"; Sonneborn Building Products Div., ChemRex Products, Inc.
 - i. "Stoncrete NM1"; Stonhard, Inc.
 - j. "Five Star Grout"; U. S. Grout Corp.
 - k. "Vibropuf #11"; Lambert Corp.
2. Erosion-Resistant Anchoring Cement:
- a. "Super Por-Rok"; Minwax Construction Products Division.

2.3 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Plain Washers: Round, carbon steel, FS FF-W-92.
- F. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S- 325, Group VIII (anchors, expansion, [nondrilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF- B-575, Grade 5.
- G. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.4 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645.
- B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-2-1035 or SSPC-Paint- 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

2.5 CONCRETE FILL AND REINFORCING MATERIALS

- A. Concrete Materials and Properties: Comply with requirements of Division 3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2,500 psi, 440 lb cement per cu. ft. minimum, and W/C ratio of 0.65 maximum, unless higher strengths indicated.
- B. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

E. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lb applied to one sq. ft. at any point in the system including panels, intermediate rails, balusters, or other elements composing the infill area.

1. Above load need not be assumed to act concurrently with loading conditions on guards or handrails.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
- D. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," and D1.3 "Structural Welding Code - Sheet Steel."
- C. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence and coordinate installation of handrails as follows:

connected material have been drawn together and conduct tests on a sampling connection bolts to determine if they have been tightened to the snug tight condition. The test sample shall consist of 10% of the bolts in the connection, but not less than two bolts, selected at random. If more than 10% of the tested bolts fail the initial inspection, the engineer reserves the right to increase the number of bolts tested.

- b. Slip Critical Connections:
1. The inspector shall monitor the calibration of torquing equipment and the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
 2. If the inspector does not monitor the calibration or installation procedures, he shall test all bolts in the affected connection using a manual torque wrench to assure that the required pretension has been reached.
2. Welding: Inspect and test during fabrication of structural steel assemblies, and during erection of structural steel all welded connections in accordance with procedures outline in AWS D1.1. Record types and location of defects found in work. Record work required and performed to correct deficiencies.
- a. Certify welders and conduct inspections and tests as required. Submit welder certifications.
 - b. Perform visual inspection of all welds.
 - c. Welds deemed questionable by visual inspection, all partial and full penetration welds, and any other welds indicated on the drawings to receive non-destructive testing shall be tested by one of the following:
 1. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 2. Ultrasonic Inspection: ASTM E 164.
3. All welds deemed unacceptable shall be repaired and retested at the Contractor's expense.
- D. Nonconforming Work: Contractor shall be responsible for correcting deficiencies in structural steel work which inspections laboratory test reports have indicated to be not in compliance with requirements. Additional tests shall be performed, at the Contractor's expense, as may be necessary to show compliance of corrected work. Any costs associated with the Engineer's review and disposition of faulty works shall be borne by the Contractor.

END OF SECTION

D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

1. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

E. Setting Plates and Base Plates:

1. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations. Refer to division 3 of these specifications for anchor bolt installation requirements in concrete.
2. Clean concrete bearing surfaces of bond-reducing materials. Clean bottom surface of setting and bearing plates.
3. Set loose and attached base plates for structural members on wedges or other adjusting devices.
4. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure. For proprietary grout materials, comply with manufacturer's instructions.

F. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated.
2. Align and adjust various members forming part of complete frame or structure before permanently fastening.
3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
5. Level and plumb individual members of structure within specified AISC tolerance.
6. Splice members only where indicated and accepted on shop drawings.
7. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

G. Erection bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surface.

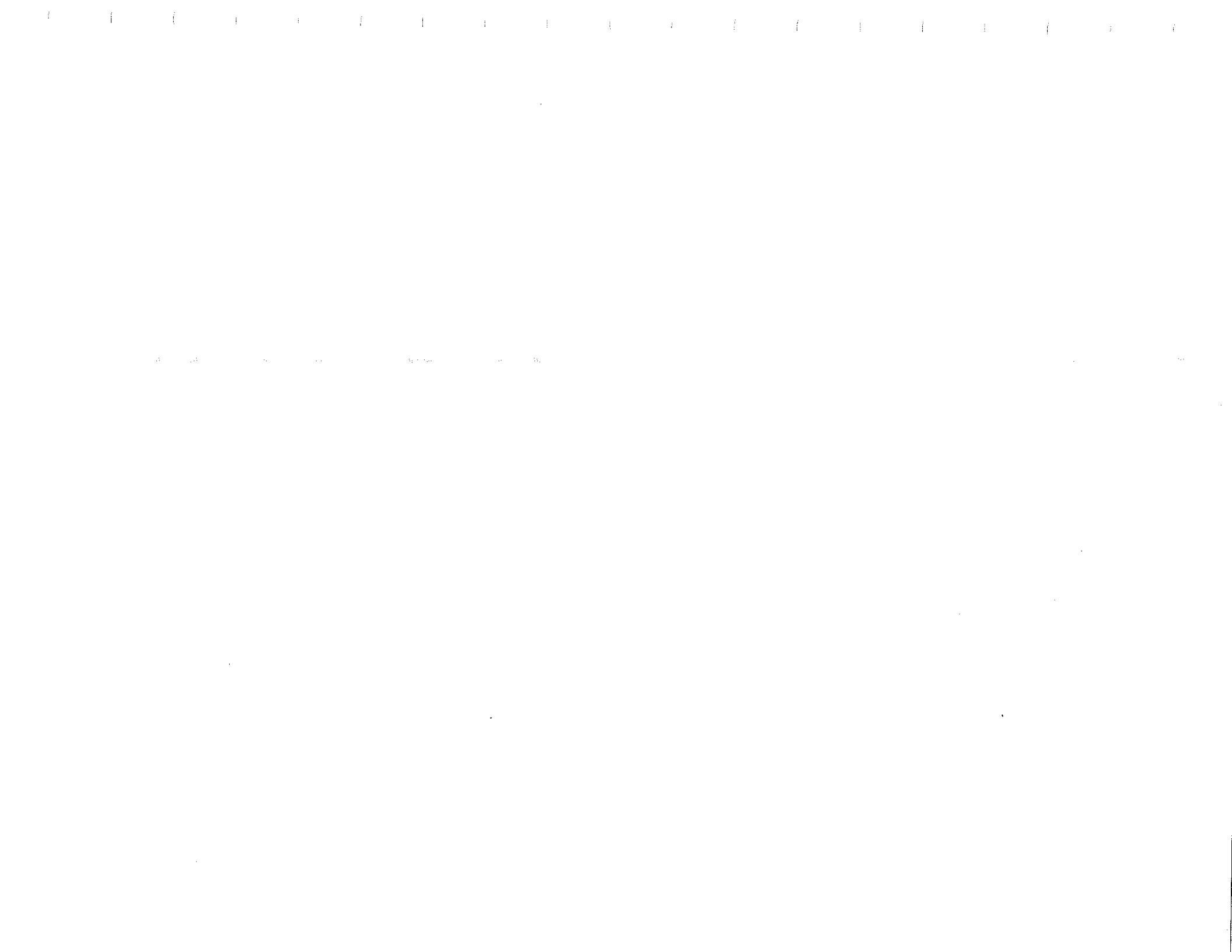
- F. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325.
 2. Direct tension indicator washers or bolts may be used at Contractor's option.
- G. Electrodes for Welding: E70XX and comply with AWS Codes.
- H. Structural Steel Primer Paint: All steel shall be fabricated and shipped as primed steel. Primer shall be fabricator's standard rust inhibitive alkyd primer. Primer color shall be gray. Primer shall be compatible with top coats specified in Section 09900.
- I. Structural Steel Top Coat: Steel permanently exposed to weather or view, or as otherwise indicated on the drawings shall be top coated per requirements of Section 09900. Color shall be selected by Architect.
- J. Steel Coatings for Exterior Embedded Steel: Exterior steel which is embedded in concrete, CMU or mortar, or as otherwise indicated on the drawings, shall be painted with TNE MEC FIBRETAR No 250 Coal Tar Epoxy. Paint embedded areas only. Do not paint surfaces which are to be welded until welding is complete.
- K. Non Shrink Cement-Based Grout: See Section 03300
- L. Galvanizing: ASTM A 525, Hot-Dipped, G-60 coating.
- 2.02 FABRICATION:
- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
1. Property mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
1. Bolt field connections, except where welded connections or other connections are indicated.
 2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

5. AWS D1.3 - 98 "Structural Welding Code" - Sheet Steel.
 6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."
1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 2. If recertification of welders is required, retesting will be the Contractor's responsibility.
- E. Fabricator Qualifications: Fabricator must be a member of the American Institute of Steel Construction (AISC), be certified in Category I of the AISC Quality Certification Program, or be a member of the Structural Steel Fabricators of New England (SSFNE). Provide certification of at least one of the above.
- 1.04 SUBMITTALS
- A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
1. Structural steel certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.
 2. High-strength bolts (each type), including nuts and washers.
 3. Structural steel primer paint.
 4. Structural steel top coat paint. (Refer to Section 09900.)

B. Shop Drawings:

1. General: Submit shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams. Use of structural Contract Documents as erection or detail drawings will not be permitted.
 - a. Include details of cuts, connections, camber, holes and other pertinent data.
 - b. Indicate welds by standard AWS symbols, and show size, length and type of each weld.
 - c. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed by others.

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2.4 FLUE LINER

- A. Flue liner: Minimum 5/8" thick fire clay liner, ASTM C315.

2.5 FLASHINGS

- A. Copper Flashings: 16 oz/sq ft sheet copper.

2.6 ACCESSORIES

- A. Weeps: Preformed plastic tubes, cotton wick filled.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.

3 PART 3 EXECUTION**3.1 EXAMINATION AND PREPARATION**

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. Coordinate placement of anchors supplied to other Sections.

3.2 COURSING

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Concrete Masonry Units:
1. Bond: Running.
 2. Coursing: One unit and one mortar joint to equal 8 inches.
 3. Mortar Joints: Concave.

3.3 WEEPS

- A. Install weeps in veneer at 24 inches oc horizontally above through-wall flashing.

3.4 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install joint reinforcement as indicated.

3.5 FLUE LINER

- A. Install flue liner from a point a minimum of 8" below lowest vent and extend full height of chimney. Provide air space between liner and masonry enclosure. Extend liner above top of chimney and provide mortar wash.

3.6 MASONRY FLASHINGS

- A. Extend flashings horizontally at roof intersection.
- B. Turn flashing up minimum 8 inches and bed into mortar joint of masonry.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 C780.
- B. Add mortar color and admixtures in accordance with manufacturer's instructions.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Apply bonding agent to existing concrete surfaces.

3.2 INSTALLATION

- A. Install mortar in accordance with ASTM C780.
- B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement.

3.3 SCHEDULES

- A. Masonry Chimneys: Type S mortar with Type N pointing mortar.

...END OF SECTION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

5. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
6. Use epoxy-based mortar for structural repairs, where directed by the Architect.
7. Repair methods not specified above may be used, subject to acceptance of the Architect.

3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. The Owner shall employ a testing laboratory to inspect, sample and test the materials and the production of concrete and to submit test reports. Concrete testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board or ACI Concrete Field Testing Technician Grade I.
- B. Concrete shall be sampled and tested for quality control during placement of concrete shall include the following, unless otherwise directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172.
 1. Slump: ASTM C 143; one test for each concrete load at point of discharge and one test for each set of compressive strength test specimens. Sample shall be taken from middle third of the load per ASTM C172. A slump test must be run prior to the incorporation of the CFP fibers per recommendations of ACI 544. A slump test must be run prior to the addition of a high-range water reducer (superplasticizer) per recommendations of ACI 301.
 2. Air Content: ASTM C 231 "Pressure method for normal weight concrete." One test for each concrete load, measured at point of discharge and one test for each set of compressive strength specimens.
 3. Concrete Temperature: Per ASTM C-1064; One test for each load and one test each time a set of compression test specimens are made.
 4. Compression Test Specimen: ASTM C 31; one set of 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.
 - a. Fiber reinforced concrete test specimens shall be vibrated externally per recommendations ACI 544.

- c. Separating compound may be used as a curing medium if applied in accordance with manufacturer's specifications.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Protection From Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

3.11 REMOVAL OF FORMS:

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg.F (10 deg.C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and support.

3.12 REUSE OF FORMS:

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and latency, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.13 MISCELLANEOUS CONCRETE ITEMS:

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix,

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a minimum flatness F-Number F30, minimum levelness F-Number, F25. Grind smooth any surface defects which would telegraph through applied floor covering system.
- D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.
1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- 3.10 CONCRETE CURING AND PROTECTION:
- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 as herein specified.
1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
 3. Curing shall be continued for at least 7 days in the case of all concrete except high-early-strength concrete for which the period shall be at least 3 days. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the specified strength, f_c. If one of the curing procedures below is used initially, it may be replaced by one of the other procedures any time after the concrete is 1 day old provided the concrete is not permitted to become surface dry during the transition.
 4. When the mean daily temperature is less than 40 deg.F, the temperature of the concrete shall be maintained between 50 and 70 deg.F for the required curing period.
 - a. When necessary, arrangements for heating, covering, insulation, or housing the concrete work shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless precautions are

- E. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
1. When air temperature has fallen to or is expected to fall below 40 deg.F (4 deg.C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg.F (10 deg.C), and not more than 80 deg.F (27deg.C) at point of placement.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.
 4. All temporary heat, form insulation, insulated blankets, coverings, hay or other equipment and materials necessary to protect the concrete work from physical damage caused by frost, freezing action, or low temperature shall be provided prior to start of placing operations.
 5. When the air temperature has fallen to or is expected to fall below 40 deg.F, provide adequate means to maintain the temperature in the area where concrete is being placed between 50 and 70 deg.F.
- F. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg.F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Wet forms thoroughly before placing concrete.
 4. Do not use retarding admixtures without the written acceptance of the Architect.
- 3.08 FINISH OF FORMED SURFACES:
- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This concrete surface shall have texture imparted by form facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down or chipped off.

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating material manufacturer's directions. Do not allow excess form coating to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.07 CONCRETE PLACEMENT:

- A. **Preplacement Review.** Footing bottoms, reinforcement and all work shall be subject to review by the Architect. Verify that reinforcing, ducts, anchors, seats, plates and other items to be cast into concrete are placed and securely held. Notify Architect 48 hours prior to scheduled placement and obtain approval or waiver of review prior to placement. Moistened wood forms immediately before placing concrete where form coatings are not used. Be sure that all debris and other foreign matter is removed from forms.
- B. **General:** Comply with ACI 304, and as herein specified.

- 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.
- 2. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.
- 3. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:
 - a. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.
 - b. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long, and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

- G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Form Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
 - 1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is 1" inside concrete and will not leave holes larger than 1" diameter in concrete surface.
- I. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- J. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
 - 1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
 - 2. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 3. Place reinforcement to obtain specified coverages for concrete protection within tolerances of ACI-318. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
 - 4. Fiber Reinforcing shall be introduced directly into the concrete either at the batch plant or job site at the rate of 1.6 pounds (minimum) per cubic yard. If introduced at the batch plant with the aggregate, no extra mixing time is required. If added at the job site, approximately 3 to 5 minutes mixing at agitating speed is required.
 - 5. Install welded wire fabric in flat sheets in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

- mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.
- B. Submit written reports to Architect of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Proportion design mixes to provide concrete with the following properties:
1. Footings and foundation walls
 - a. Strength: 3000 psi @28 days, 3/4" aggr.
 - b. W/C Ratio: 0.55 maximum
 - c. Entrained Air: 6% maximum
 - d. Slump: 4" maximum
 2. Interior Slabs on grade:
 - a. Strength: 4000 psi @28 days, 3/4" aggr.
 - b. W/C Ratio: 0.48 maximum
 - c. Entrained Air: 6% maximum, 3% minimum
 - d. Slump: 4" maximum*
 3. Exterior Slabs and all other exposed Site Concrete:
 - a. Strength: 4000 psi @28 days, 3/4" aggr.
 - b. W/C Ratio: 0.40
 - c. Entrained Air: 8% maximum, 4% minimum
 - d. Slump: 4" maximum
 4. Add air entraining admixture at manufacturers prescribed rate to result in concrete at point of placement having the above noted air contents.
 5. Additional slump may be achieved by the addition of a mid-range or high-range water reducing admixture. Maximum slump after the addition of admixture shall be 8".
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor, when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.
1. Water may be added at the project only if the maximum specified slump and design mix maximum water/cement ratio is not exceeded.
 2. Additional dosages of superplasticizer should be used when delays occur and required slump has not been maintained. A maximum of two additional dosages will be permitted per ACI 212.3R recommendations.

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendation, unless otherwise specified. Wood, clay brick and other devices are not acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
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 I) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS:

A. Portland Cement: ASTM C 150, Type I or Type II, unless otherwise approved Use one brand of cement throughout project, unless otherwise acceptable to Architect.

B. Normal Weight Aggregates: ASTM C 33. Provide from a single source for exposed concrete. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.

C. Light Weight Aggregates: ASTM C 330.

D. Water: Potable.

E. Air-Entraining Admixture: ASTM C 260.

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G containing not more than 1% chloride ions.

1. Fiber reinforcing shall be added and distributed prior to incorporation of Super Plasticizer.

G. Normal range water reducing admixture: ASTM C 494 Type A containing no calcium chloride.

H. Accelerating Admixture: ASTM C 494, Type C or E.

I. Calcium Chloride not permitted.

2.04 RELATED MATERIALS:

A. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

1. Polyethylene sheet not less than 8 mils thick.

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the following except where more stringent requirements are shown or specified:

1. ACI 211.1-91 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
2. ACI 212.3R-91 "Chemical Admixtures for Concrete."
3. ACI 301-89 "Specifications for Structural Concrete for Buildings."
4. ACI 302.1R-89 "Guide for Concrete Floor and Slab Construction."
5. ACI 304R-89 "Guide for Measuring, Mixing, Transporting and Placing Concrete."
6. ACI 304.2R-91 "Placing Concrete by Pumping Methods."
7. ACI 306 R-88 "Cold Weather Concreting."
9. ACI 308-92 "Standard Practice for Curing Concrete."
10. ACI 309R-87 "Guide for Consolidation of Concrete."
11. ACI 315-80 (86) "ACI Detailing Manual."
12. ACI 318-94 "Building Code Requirements for Reinforced Concrete."
13. ACI 347R-88 "Guide to Formwork for Concrete."
14. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars," 1992.

B. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement, polypropylene fiber admixtures, patching compounds, non-shrink grout, waterstops, joint systems, curing compounds, and others as requested by Architect.
- B. Shop Drawings: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315, showing bar schedules, stirrup spacing, diagrams of bent bars and arrangement of concrete reinforcement. Include special

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Island View Apartments

- (6) Responsibility: The Contractor's responsibility for maintenance shall cease at the time of certification of acceptability by the Landscape Architect. During the guarantee period, the Contractor shall be held responsible for making replacements, but no maintenance shall be required, other than spraying and dusting.

3.6 Replacement

- a. At the end of the guarantee period, inspection will be made by the Landscape Architect upon written notice requesting such inspection submitted by the Contractor at least ten (10) days before the anticipated date. Any plant required under this Contract that is dead or not in satisfactory condition, as determined by the Landscape Architect, shall be removed from the site. These, and any other plants missing due to the negligence of the Contractor, shall be replaced with plants of the same type and size as originally specified. Replanting shall be done as soon as conditions permit, but during the normal planting season. Plant items in accordance with these specifications.

3.7 Clean-up

- a. The Landscape Contractor shall remove all debris, construction equipment, excess fill, rocks, and other excess material caused by his work, from the site upon completion of his portion of the work.