

14. Tolerance: Finished slabs shall be level with tolerance of 1/8" in ten feet, when tested with ten foot straight edge placed on the surface at not less than two different angles. Uniformly slope surface to area drain.
15. The Contractor shall engage and pay for a testing laboratory for strength and slump test.
- a. Test specimens for compressive strength in accordance with ASTM C31 and C39.
- b. Make at least one strength test for each 100 cubic yards, or fraction thereof, of each mix design of concrete placed in any 1 day.
- c. Prepare five (5) test cylinders from each of the above samples in accordance with ASTM C32 for laboratory cured specimens. Test two (2) cylinders at age 7 days for preliminary indication of design strength. Test two (2) cylinders at age 28 days for the basis of quality control as specified by ACI 318. Retain one (1) cylinder for 45 day testing if required.
- d. Determine slump of the concrete sample for each strength test in accordance with ASTM C143.
- e. Determine percent of air content in accordance to ASTM C231 or ASTM C173.
16. Average of any three consecutive 28-day strength tests shall be equal to or greater than specified strength, and not more than 10% of tests shall have values less than specified strength. In no case shall a test have a value less than 90% of specified strength.

DIVISION 4 MASONRY

SECTION 04200 - CONCRETE UNIT MASONRY

1. Concrete Masonry Units:

- a. Concrete masonry units shall be from one manufacturer, of uniform texture and color for each type required.
- b. Concrete masonry units:
- Standard Units: Nominal face dimensions of 8 inch x 16 inches long, unless otherwise indicated; complete with corners, bases, bond beams, lintels and fillers to match concrete masonry units; 1-1/4" minimum face shall be cured in a moisture-controlled atmosphere or in an autoclave of normal pressure and temperature to comply with ASTM C90, Grade N, Type I.
 - Decorative Concrete Masonry Units: ASTM C 90; Weight Classification, Normal Weight; Type I, moisture-controlled units. Exposed faces with split-face finish. Special shapes for lintels, corners, jambs, soah, central joints, and other special conditions.
- c. When concrete unit masonry units are removed from the manufacturer's storage area, each cube or block shall be covered on top and all sides with a waterproof protective material. Protective covering shall be applied prior to the blocks being exposed to the weather.

2. Mortar: ASTM C476, Type S, 1800 psi at 28 days.

- Portland Cement: ASTM C150, Type I.
- Aggregates: ASTM C144, standard masonry type; clean, dry and protected against dampness, freezing and foreign matter.
- Hydrated Lime ASTM C207, Type S.
- Water: Clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.
- Use no admixtures unless written approval is obtained from Owner.

3. Grout: Masonry mortar, consistency which will completely fill all spaces intended to receive grout.

4. Reinforcing Bars: 60 ksi yield grade; deformed billet steel bars, ASTM A615.

5. Horizontal reinforcement: Truss type ASTM A92 hot dip galvanized steel wire after fabrication ASTM A153 Class B2 with not less than #9 side rods with #9 cross rods.

6. Wire--O-Wal, AA Wire Products, Heckman, or equal.

7. Waterproofing at CMU: Hydro-Seal 75, Grey 3, by Northern Industries, Inc.; high strength, hydrophobic, breathing type, two-component, modified epoxy coating manufactured from a balanced ratio of fillers, and water extended resins and hardeners. Install in strict accord with manufacturer's written installation requirements.

8. Maintain materials and surrounding air temperature to minimum 50 degree F. prior to, during and 48 hours after completion of masonry work or until complete hydration of the mortar is achieved whichever is greater.

9. During freezing or near freezing weather provide adequate equipment or cover to maintain a minimum temperature of 50-degree F. and to protect masonry work completed or in progress.

10. Establish lines, levels, and coursing. Protect from disturbances.

11. Thoroughly mix mortar ingredients, in quantities needed for immediate use.

12. If necessary, re-temper mortars to replace water lost by evaporation, but do not re-temper or use mortar after two (2) hours from the initial mixing time.

13. Place masonry true, level and plumb in accordance with required lines and levels. Do not wet concrete masonry units. Align all vertical cells to maintain a clear, unobstructed system for grouting.

14. Full bond external and internal corners and intersections.

15. Buttering corners of joints and deep or excessive furrowing of mortar joints will not be permitted.

16. Do not shift or tap masonry after mortar has taken initial set. Where adjustments must be made, remove mortar and replace.

17. Lay out masonry so not less than one-third (1/3) of the face of a unit is exposed on the face of the wall at openings, corner or offsets.

18. Perform jobsite cutting of masonry with proper power tools to provide straight and true, unchipped edges.

19. Ensure masonry courses are of uniform height. Make vertical and horizontal joints equal and uniform thickness. Lay in full bed of mortar, properly jointed with other work.

20. Remove excess mortar and projections. Take care to prevent breaking masonry corners.

21. Lay all masonry units in running bond course 1 block unit and 1 mortar joint to equal 8 inches. Form concave mortar joints, where exposed; strike flush where concealed.

22. Provide temporary bracing during masonry erection; maintain in place until building structure provides permanent bracing.

23. Place masonry reinforcing and anchorages for concrete unit masonry as follows:

- Provide single wythe walls with horizontal masonry reinforcing in every second mortar joint.
- Place horizontal masonry reinforcing in first and second joint above and below openings, continuous in first and second joint below top of walls.
- Fully reinforce corners and intersections, using prefabricated corner and 'Y' reinforcement sections.
- Lap masonry reinforcing splices minimum 6 inches.
- Place vertical reinforcing at indicated centers. Grout core voids to 1" below maximum lifts.

24. As work progresses, build-in anchor bolts, and other items embedded in masonry.

25. Remove excess mortar and smears upon completion of masonry work.

26. Clean soiled surfaces of all masonry work exposed to staining agents, including water and water, fiber brushes and soap as required. Remove all mortar, stains and other defacements.

27. Clean and remove all mortar droppings from floor.

28. Cover tops of walls when work is not in progress.

SECTION 04210 - THIN BRICK MASONRY

1. Section includes Thin Brick Masonry units, Mortar, accessories and installation.

2. References:

- ASTM C 1088: Thin brick units made from clay or shale
 - ASTM C 216: Standard specification for modular face brick
3. Deliver products to site under provisions of these specifications
- Store and protect products on site.
 - Store mortar and other moisture-sensitive materials in protected enclosures; handle by methods which avoid exposure to moisture.

SECTION 05000 - BRICK MASONRY cont.

4. Provide manufacturer's written warranty for a period of fifteen years from the date of Owner acceptance of the project against defects in materials and workmanship.

5. Conform to manufacturer's printed specifications and instructions for each condition encountered on the job. In general, standard practice will be expected and accepted and poor or sloppy workmanship will be rejected.

6. Protect materials from rain, wind, moisture, and freezing temperatures prior to, during, and for 72 hours after completion of work.

7. The drawings were prepared and portions of this specification written on the basis of using the products of specific manufacturers. It is not the intent to limit competitive bidding. Products with equal characteristics by other manufacturers are acceptable under the conditions of these specifications.

8. Materials:

- Thin Brick Masonry Units: ASTM C1088 Grade Exterior, specific manufacturer, plant, product and blend as noted in finish schedule on the drawings.
- Mortar: Manufacturer's standard, premixed, pre-colored, water based masonry mortar, minimum compressive strength of 1800 psi; ASTM C270, Type S, non-staining. Color: as noted on drawings. Masonry cement will not be allowed.
- Weather-resistant Barrier: Kraft waterproof building paper, UBC Standard No. 17-1 or equal.
- Metal Lath: 18-gauge galvanized woven wire mesh, 2.5 lb. flat diamond self-furring mesh.

9. Sheathed Surface: Install two layers of weather-resistant barrier with lap joints 4 inches shingle fashion, apply code approved metal lath with galvanized nails or staples, 6 inches on center vertically and 16 inches on center horizontally.

10. Mortar Mixing: Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C482, Type S.

11. Laying: Apply to wall with adhesive mortar. Press units firmly into position in the mortar bed, joggle each unit to bond firmly, causing slightly around edges of units. Maximum area of application to be 10 SF at a time. Minimum width of cut unit to be 3 inches.

12. Joints: Joints shall be 3/8" inch in width; shall be uniform. Install outside corner return units with varying lengths as required.

13. Pointing: Fix adhesive mortar to be applied after 72 hour curing period. Fill joint to create concave joint. Mortar to be applied in plastic, workable condition using grout bag or similar device.

14. Cleaning: Clean surfaces in accordance with manufacturer's recommendations. Use non-metallic tools in cleaning operations.

15. Mock-Up: Provide 4 foot x 4 foot masonry wall mock-up with corner units included for Owner approval before proceeding with building installation.

SECTION 04700 - THIN SET STONE VENEER

1. Hill Country "Chalk" with water table, Color Birch, as distributed by Lone Star Stone, Whitney, Texas.

2. Mortar: Manufacturer's standard, premixed, precolored, water based masonry mortar, minimum compressive strength of 1800 psi; ASTM C270, Type S, non-staining. Color: Texas Tan. Masonry cement will not be allowed.

3. Weather-resistant Barrier: Kraft waterproof building paper, UBC Standard No. 17-1 or equal.

4. Metal Lath: 18-gauge galvanized woven wire mesh, 2.5 lb. flat diamond self-furring mesh.

5. Sheathed Surface: Install one layer of weather-resistant barrier with lap joints 4 inches shingle fashion, apply code approved metal lath with galvanized nails or staples, 6 inches on center vertically and 16 inches on center horizontally.

6. Mortar Mixing: Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C482, Type S.

7. Laying: Apply to wall with adhesive mortar. Press units firmly into position in the mortar bed, joggle each unit to bond firmly, causing slightly around edges of units. Maximum area of application to be 10 SF at a time. Minimum width of cut unit to be 3 inches.

8. Joints: Joints shall not be over 1/2" inch in width; shall be uniform. Install outside corner return units with varying lengths.

9. Pointing: Fix adhesive mortar to be applied after 72 hour curing period. Fill joint to create slightly concave joint. Mortar to be applied in plastic, workable condition using grout bag or similar device. Joints to be smooth and flush at locations covered by owner provided graphics and artwork.

10. Cleaning: Clean surfaces in accordance with manufacturer's recommendations. Use non-metallic tools in cleaning operations.

11. Mock-Up: Provide 4 foot x 4 foot stone wall mock-up with corner units included for Owner approval before proceeding with building installation.

12. Provide a fifteen-year, manufacturer's written warranty, against defects in materials and workmanship.

DIVISION 5 METALS

SECTION 05120 - STRUCTURAL STEEL

1. Code and Standards: AISC "Specifications for the Design, Fabrication and erection of Structural Steel for Buildings" including "Commentary"; AWS "Structural Welding Code", comply with applicable provisions except as otherwise indicated.

2. Shop Drawings: Show complete details of schedule, (if required) for fabrication, assembly and erection. Furnish anchor bolts required for installation in other work; furnish templates for bolt installation.

3. Steel Plates, Shapes, Bars: ASTM A 36.

4. Cold-Formed Steel Tubing: ASTM A500, Grade B.

5. Steel Pipes: ASTM A53, Type E, S, Grade B, Schedule 40 unless otherwise noted.

6. Fasteners: High-strength bolts and nuts ASTM A325 or A490; unfinished bolts and nuts, ASTM A307. Grades and rivets, ASTM A502, Grade 1.

7. Shop Painting: FSS 1-P-86, Type II; or SSPC-Paint 14. Fabrication Company with AISC "Specifications" and final shop drawings. Mark and match-mark site for field assembly.

8. Connections: As shown on final shop drawings. Use high-strength bolts for field connections, except as otherwise indicated.

9. Welds: a. Comply with AWS Code for procedures, appearance and quality of welds.

10. Provisions for Other Work: Fabricate structural steel members to provide holes for securing either work and for passage of other work through steel framing as indicated.

11. Shop Painting: Paint structural steel work, except members or portions of members embedded in concrete or mortar, and contact at areas to be welded or riveted. Clean steel free of loose mill scale, rust, oil, and grease. Apply prime paint to provide a minimum dry film thickness of 2.0 mils.

12. Erection: Comply with AISC Code and Specification, and maintain work in safe and stable condition during erection. Provide temporary bracing and shoring as required; remove when final connections placed.

13. Erection: a. Set base plates on cleaned bearing surfaces, using wedges or other adjustments as required. Solidly pack open spaces with commercial non-shrink grout. b. Splice members only where shown on final shop drawings. c. Touch-up prime paint after erection. Clean field welded, bolted connections and abraded areas, and apply same type paint as used in shop.

SECTION 05500 - METAL FABRICATION

1. Work includes miscellaneous shop fabricated ferrous metal items, including but not limited to:

- Loose steel lintels
- Miscellaneous framing, supports and trim
- Roof Ladders
- Steel deck panels

2. Materials:

- Steel Sections: ASTM A36.
- Steel Tubing: ASTM A500 or ASTM A501.
- Stainless Steel: Type 304 (18-8), ASTM A269; Satin polished finish.
- Steel Pipe: ASTM A53, Grade B, standard weight (Schedule 40).
- Welding Iron Castings; ASTM A47.
- Bolts, Nuts, and Washers: ASTM A307.
- Welding Material: AWS D1.1; type required for materials being welded.
- Primer SSPC-Paint 2, for shop application and field touch-up.
- Steel Deck Panels: ASTM A446 with G90 galvanized coating, steel ASTM A611, Grade C, Shop Primed.

3. Fabrication:

- Verify dimensions in field prior to shop fabrication.
- Fabricate items with joints tightly fitted and secured.
- Fit and shop assemble in largest practical sections, for delivery to site.
- Prime paint items schedule to provide a uniform dry film thickness of 2.0 mils.

4. Ladders:

a. Fabricate ladders for the locations shown, with dimensions; spacing, details and anchorage as indicated. Comply with the requirements of ANSI A 14.3, except as otherwise indicated.

- Unless otherwise shown, provide 1/2" x 2-1/2" continuous structural steel flat bar side rails with eased edges, spaced 24" apart.
- Provide 3/4" diameter solid structural steel bar rung, spaced 12" o.c.

b. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

c. Support each ladder at top and bottom and at intermediate points, spaced not more than 5'-0" o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage, and to hold ladder clear of the wall surface with a minimum of 7" clearance wall to centerline of rungs. Return rails to wall or structure unless other secureholds are provided.

d. 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 granules.

DIVISION 6 - WOOD & PLASTICS

SECTION 06100 - ROUGH CARPENTRY

1. Framing Lumber: American Softwood Lumber Standards PS20, S4S, 19% maximum moisture content, with the following minimum working stresses:

Bending (fb) = 1500 psi
Horizontal Shear (fv) = 95 psi
Compression Perpendicular to Grain (fc) = 390 psi
Modulus of Elasticity (E) = 1,500,000

a. Members in contact with concrete, masonry, or roof shall be preservative treated, AWPB LP-2.

b. Fire retardant treated lumber: AWPB C20.

2. Plywood: PS1, factory marked with appropriate APA trademark. Water or particle board not acceptable. Protect all plywood from moisture by use of all required waterproof covering. The plywood has in turn been covered with the next succeeding component of the wall or ceiling.

a. Roof sheathing: APA rated sheathing, 40/20, size as noted on Structural drawings, Exposure 1.

b. Wall sheathing: APA rated sheathing, 32/16, size as noted on Structural drawings, Exposure 1.

c. Interior wall blocking: APA B-D rated utility panel, 5/8" nominal, Interior, Group 2.

3. Building wrap: a. At CEILING: Tyvek "Stucco Wrap," by DuPont Company, Wilmington, Delaware. b. At all other locations: Tyvek "Commercial Wrap," by DuPont Company, Wilmington, Delaware.

4. Nails, Spikes, and Staples: Galvanized for exterior locations of treated wood; plain finish for other interior locations; size and gauge to suit application.

5. Bolts, Nuts, Washers, Pins, and Screws: Medium carbon steel, sized to suit application, galvanized for exterior locations and untreated for all other interior locations.

6. Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolts or power activated type for anchorage to steel trusses.

7. Erect and frame, furring, stripping, plywood backing and nailing members true to lines and layout. Do not deviate from true alignment more than 1/4 inch.

8. Comply with NFPA National Design Specification for Wood Construction recommendations for sizes and openings of members, nailing schedule, and for framing openings if sizes, spaces, or opening blocking are indicated.

9. Provide blocking for support of wall mounted cabinetwork, hardware, toilet partitions, urinal screens, toilet accessories, and plumbing fixtures unless other means of support is indicated.

10. Do not splice structural members between supports.

SECTION 06170 - LAMINATED VENEER LUMBER

1. SECTION INCLUDES

- Laminated Veneer Lumber (LVL) framing members.
- Hardware and connectors

2. QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer experienced in Laminated Veneer Structural Timber production, and capable of providing field service representation during construction.

3. REFERENCE STANDARDS

- ASTM D2559 Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions.
- ASTM D5456 Specification for Evaluation of Structural Composite Lumber Products.
- National Design Specification for Wood Construction (NDS).
- Materials shall comply with ESR Report #ESR-2893.

4. SUBMITTALS

A. Submit per SUBMITTALS Section for acceptance prior to start of fabrication. Show lumber combinations (AISC and AWPB combination symbols for identification), details, methods and sequences of assembly, erection diagrams and instructions for use in field.

B. Manufacturer's Product and Material Safety Data Sheets, for all specified products.

C. Shop Drawings: Submit data showing product components, including finish.

5. MATERIALS

A. Basis for Design: RedBuilt RedLam Timber.

B. Southern Pine, touch sanded, E = 2.0E5 psi, Fb = 2900 psi; sizes, shapes and profiles as indicated in Contract Documents.

C. Grade Stamps: All RedLam LVL materials shall comply with NES Report No. NER-481.

D. Hardware: Furnish connections for joining members to each other and/or supports.

6. FABRICATION

A. LVL shall be manufactured in a plant listed in the above referenced reports under the supervision of an approved third-party inspection agency. It shall be manufactured in a continuous process with all grain parallel with the length of the members.

B. LVL shall be manufactured in a continuous process from wood fiber with all strands oriented to the length of the member and then fed into a press. All members are to be free of finger or scarf joints.

C. Adhesives shall be of waterproof type conforming to the requirements of ASTM D2559.

D. Preservative Treatment: Pressure treat members or portions of members in contact with concrete or exterior to conform to AWPB standard C-28; retention 0.3 lb/cu ft. of wood.

E. Protection: Individually wrap each member

7. STORAGE AND PROTECTION OF MATERIALS

A. Contractor receive, unload and store materials. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

8. ERECTION

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

B. General: Handle with non-marking slings. Erect in accord with accepted shop drawings.

1. Minor Misfits: Correction of minor misfits by moderate use of drift pins, and moderate amount of reaming, chipping or cutting is considered part of erection. Immediately report errors which prevent proper assembly of parts by these measures to Architect for authorization of corrective measures prior to assembly.

C. Install per the Contract Documents and manufacturer's recommendations. Holes, cuts or notches not shown on the contract documents shall not be permitted.

9. PROTECTION OF COMPLETED WORK

A. Keep protective wrappings in place until members are enclosed within building. Gradually bring initial building heat or cooling to desired level. To minimize checking, do not reduce relative humidity of building rapidly.

SECTION 06192 - WOOD CHORD METAL TRUSSES

1. Furnish labor, material, services, equipment and appliances required for Wood Chord Metal Truss work indicated on the drawings and specified herein.

2. SUBMITTALS:

a. Product Data: Submit fabricator's specifications and installation instructions for required work, covering lumber, metal plates, hardware, fabrication process, treatment (if any), handling and erection.

i. Submit certification, signed by an officer of fabricating firm, indicating that trusses to be supplied for project comply with indicated requirements.

b. Shop Drawings: Submit shop drawings showing: species, sizes and stress grades of lumber to be used; 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.

i. Fabricator shall submit design analysis indicating loading, section modulus, assumed allowable stress calculations, and similar information needed for analysis and to ensure that trusses comply with design requirements.

ii. Shop drawings shall be prepared and stamped by a structural engineer licensed to practice in the State where trusses are to be erected.

3. The drawings are prepared and portions of this specification written on the basis of using the products of RedBuilt, LLC, Boise, Idaho.

4. Trusses:

a. Trusses shall be factory manufactured with steel webs, true pin connections and structural wood chords.

b. Top and Bottom Chords: Structural wood chord members shall be of machine stress rated lumber of approved grade and kiln dried to a maximum moisture content of 15%.

c. Web Members: Accurately die stamped from electrically welded, cold rolled steel tubing having a minimum yield strength of 45,000 psi.

d. Connecting Pins and Bearing Members: Material and size as required by design.

e. Refer to structural drawings for additional design requirements governing open web wood trusses.

5. The standards of manufacturer for quality, engineering and fabrication shall govern the work of this section.

6. Protect trusses and accessories from damage when stored at the job site. Finished members shall be free of bends, twists or open joints. Replace warped, bowed or damaged trusses at no additional cost to the Owner.

7. Handle and install in a manner to prevent bending, warping, twisting or other damage.

8. Erect in complete accord with the plans and approved shop drawings. Provide erection bracing in addition to specified bridging to keep trusses straight and plumb as required to assure adequate lateral support for the individual truss and entire system until decking material has been applied.

SECTION 06194 - PREFABRICATED WOOD TRUSSES ("GANG NAIL")