

## SECTION 061753 SHOP FABRICATED WOOD TRUSSES

### 1.01 WORK INCLUDED

Design, manufacture, and supply wood trusses as shown on the Construction Documents and as specified.

### 1.02 DEFINITIONS

- A. *BCSI*: Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses jointly produced by the Structural Building Components Association and the Truss Plate Institute.
- B. *Building Designer*: Owner of the Building or the person that contracts with the Owner for the design of the Framing Structural System and/or who is responsible for the preparation of the Construction Documents. When mandated by the Legal Requirements, the Building Designer shall be a Registered Design Professional.
- C. *Building*: Structure used or intended for supporting or sheltering any use or occupancy.
- D. *Building Code*: As it applies to a Building, any set of standards set forth and enforced by a Jurisdiction for the protection of public safety.
- E. *Building Official*: Officer or other designated authority charged with the administration and enforcement of the Building Code, or a duly authorized representative.
- F. *Construction Documents*: Written, graphic and pictorial documents prepared or assembled for describing the design (including the Framing Structural System), location and physical characteristics of the elements of a Building necessary to obtain a Building Permit and construct a Building.
- G. *Contractor*: Owner of a Building, or the person who contracts with the Owner, who constructs the Building in accordance with the Construction Documents and the Truss Submittal Package. The term "Contractor" shall include those subcontractors who have a direct contract with the Contractor to construct all or a portion of the construction.
- H. *Cover/Truss Index Sheet*: Sheet that is signed and sealed, where required by the Legal Requirements, by the Truss Design Engineer, and depending on the Legal Requirements shall be permitted to contain the following information: (1) identification of the Building, including Building name and address, lot, block, subdivision, and city or county; (2) identification of Construction Documents by drawing number(s) with revision date; (3) specified Building Code; (4) computer program used; (5) roof dead and live loads; (6) floor dead and live loads; (7) wind load criteria from a specifically defined code (e.g., *ASCE 7*) and any other design loads (such as ponding, mechanical loads, etc.); (8) name, address and license number of Registered Design Professional for the Building, if known; (9) a listing of the individual identification numbers and dates of each Truss Design Drawing referenced by the Cover/Truss Index Sheet; and (10) name, address, date of drawing and license number of Truss Design Engineer.
- I. *Framing Structural System*: Completed combination of Structural Elements, Trusses, connections and other systems, which serve to support the Building's self-weight and the specified loads.
- J. *Jurisdiction*: Governmental unit that is responsible for adopting and enforcing the Building Code.
- K. *Legal Requirements*: Any applicable provisions of all statutes, laws, rules, regulations, ordinances, codes, or orders of the governing Jurisdiction.
- L. *Owner*: Person having a legal or equitable interest in the property upon which a Building is to be constructed, and: (1) either prepares, or retains the Building Designer or Registered Design Professional to prepare the Construction Documents; and (2) either constructs, or retains the Contractor to construct the Building.

- M. *Registered Design Professional*: Architect or engineer, who is licensed to practice their respective design profession as defined by the Legal Requirements of the Jurisdiction in which the Building is to be constructed.
- N. *Standard*: National Design Standard for Metal Plate Connected Wood Truss Construction (*ANSI/TPI 1*).
- O. *Structural Element*: Single structural member (other than a Truss) that is specified in the Construction Documents.
- P. *Truss*: Individual metal-plate-connected wood component manufactured for the construction of a Building.
- Q. *Truss Design Drawing*: Written, graphic and pictorial depiction of an individual Truss that includes the information required in the Standard.
- R. *Truss Design Engineer*: Person who is licensed to practice engineering as defined by the Legal Requirements of the Jurisdiction in which the Building is to be constructed and who supervises the preparation of the Truss Design Drawings.
- S. *Truss Designer*: Person responsible for the preparation of the Truss Design Drawings.
- T. *Truss Manufacturer*: Person engaged in the fabrication of Trusses.
- U. *Truss Placement Diagram*: Illustration identifying the assumed location of each Truss.
- V. *Truss Submittal Package*: Package consisting of each individual Truss Design Drawing, and, as applicable, the Truss Placement Diagram, the Cover/Truss Index Sheet, Lateral Restraint and Diagonal Bracing details designed in accordance with generally accepted engineering practice, applicable *BCS/* defined lateral restraint and diagonal bracing details, and any other structural details germane to the Trusses.

### 1.03 DESIGN

- A. Trusses shall be designed in accordance with the Standard and where any applicable design feature is not specifically covered herein, design shall be in accordance with the applicable provisions of the latest edition of the American Forest & Paper Association's (AF&PA's) *National Design Specification® (NDS®) for Wood Construction* and all applicable Legal Requirements.
- B. Truss Manufacturer shall furnish Truss Design Drawings prepared in accordance with all applicable Legal Requirements.
- C. If required by the Construction Documents and the Truss Manufacturer's contract, the Truss Manufacturer shall furnish a Truss Placement Diagram which shall provide at a minimum the location assumed for each Truss based on the Truss Manufacturer's interpretation of the Construction Documents.
- D. Where required by the Truss Manufacturer's contract, any local building official or applicable legal requirements, the Truss Manufacturer shall submit the Truss Submittal Package to the Building Designer and/or the local Building Official for review and approval prior to the manufacturing of the Trusses.
- E. The Truss Design Drawings shall include, at a minimum, the information specified below (per the Standard):
  - 1. Building Code used for Design, unless specified on Cover/Truss Index Sheet.
  - 2. Slope or depth, span and spacing.

3. Location of all joints and support locations.
4. Number of plies if greater than one.
5. Required bearing widths.
6. Design loads as applicable, including:
  - Top Chord live load (for roof Trusses, this shall be the controlling case of live load or snow load);
  - Top chord dead load;
  - Bottom chord live load;
  - Bottom chord dead load;
  - Additional loads and locations;
  - Environmental Load Design Criteria (wind speed, snow, seismic, and all applicable factors as required to calculate the Truss loads); and
  - Other lateral loads, including drag strut loads.
7. Adjustments to Wood Member and Metal Connector Plate design values for conditions of use.
8. Maximum reaction force and direction, including maximum uplift reaction forces where applicable.
9. Metal Connector Plate type, manufacturer, size, and thickness or gauge, and the dimensioned location of each Metal Connector Plate except where symmetrically located relative to the joint interface.
10. Size, species and grade for each Wood Member.
11. Truss-to-Truss connection and Truss field assembly requirements.
12. Calculated span to deflection ratio and/or maximum vertical and horizontal deflection for live and total load and  $K_{CR}$  (creep factor) as applicable.
13. Maximum axial tension and compression forces in the Truss members.
14. Fabrication tolerance per the Standard.
15. Required Permanent Individual Truss Member Restraint location and the method of Restraint/Bracing to be used per the Standard.

## 2.01 MATERIALS

### A. Lumber:

1. Lumber used shall be identified by grade mark of a lumber inspection bureau or agency approved by the American Lumber Standards Committee, and shall be the size, species, and grade as shown on the Truss Design Drawings, or equivalent as approved by the Truss Design Engineer/ Truss Designer.
2. Adjustment of value for duration of load or conditions of use shall be in accordance with *NDS*.
3. Fire retardant treated lumber, if applicable, shall meet the specifications of the fire retardant chemical manufacturer, the Truss design and the Standard and shall be re-dried after treatment in accordance with the American Wood-Preservers' Association (AWPA) Standard *C20 Structural Lumber – Fire Retardant Treatment by Pressure Processes*. Allowable values must be adjusted in accordance with *NDS*. Lumber treater shall supply certificate of

compliance.

B. Metal Connector Plates:

1. Metal connector plates shall be manufactured by a Truss Plate Institute (TPI) member plate manufacturer and shall not be less than 0.036 in. thick (20 gauge) and shall meet or exceed *ASTM A653/A653M* grade 33, and galvanized coating shall meet or exceed *ASTM A924/924M*, coating designation G60. Working stresses in steel are to be applied to effectiveness ratios for plates as determined by test and in accordance with the Standard.
2. In highly corrosive environments, special applied coatings or stainless steel may be required.
3. At the request of the Building Designer, a TPI member plate manufacturer shall furnish a certified record that materials comply with steel specifications.

**2.02 MANUFACTURING**

Trusses shall be manufactured to meet the quality requirements of the Standard and in accordance with the information provided in the final approved Truss Design Drawings.

**3.01 HANDLING, INSTALLING, RESTRAINING AND BRACING**

- A. Trusses shall be handled during manufacturing, delivery and by the Contractor at the job site so as not to be subjected to excessive bending.
- B. Trusses shall be unloaded in a manner so as to minimize lateral strain. Trusses shall be protected from damage that might result from on-site activities and environmental conditions. Trusses shall be handled in such a way so as to prevent toppling when banding is removed.
- C. Contractor shall be responsible for the handling, installation, and temporary restraint/ bracing of the Trusses in a good workmanlike manner and in accordance with the recommendations set forth in the latest edition of *BCSI*.
- D. Apparent damage to Trusses, if any, shall be reported to Truss Manufacturer prior to erection.
- E. Trusses shall be set and secured level and plumb, and in correct location. Each Truss shall be held in correct alignment until specified permanent restraint and bracing is installed.
- F. Cutting and altering of Trusses is not permitted. If any Truss should become broken, damaged, or altered, written concurrence and approval by a Registered Design Professional is required.
- G. Concentrated loads shall not be placed on top of Trusses until all specified restraint and bracing has been installed and decking is permanently nailed in place. Specifically avoid stacking full bundles of plywood or other concentrated loads on top of Trusses.
- H. Truss Submittals and any supplementary information provided by the Truss Manufacturer shall be provided by the Contractor to the individual or organization responsible for the installation of the Trusses.
- I. Trusses shall be permanently restrained and braced in a manner consistent with good building practices as outlined in *BCSI* and in accordance with the requirements of the Construction Documents. Trusses shall furthermore be anchored or restrained to prevent out-of-plane movement so as to keep all Truss members from simultaneously buckling together in the same direction. Such permanent lateral restraint shall be accomplished by: (a) anchorage to solid end walls; (b) permanent diagonal bracing in the plane of the web members; or (c) other suitable means.
- J. Materials used in temporary and permanent restraint and bracing shall be furnished by Contractor.