

## Permanent Bracing Design Specifications

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### Background:

The following note and notes similar to this are being applied to the plans and specifications in Michigan to shift responsibility for installation and bracing of trusses from the owner or registered design professional in responsible charge to the Truss Manufacturer:

Prefabricated wood truss manufacturer shall be completely responsible for the design, detailing and installation of all trusses including bracing, connections and special reinforcement.

The following analysis is based on the current engineering laws of the state of Michigan<sup>1</sup> and the 2003 Michigan Building Code (MBC), which is based on the nationally recognized model building code the 2003 International Building Code (IBC)<sup>2</sup>.

### Key Definitions:

#### **BUILDING STRUCTURAL SYSTEM:**

The completed combination of Structural Elements, Trusses, connections and systems, which serve to support the Building's self weight, the applicable live load(s), and all environmental loads.

#### **CONTRACTOR:**

The Owner of the Building, or the individual or organization who contracts with the Owner, and is responsible for the construction of the Building in accordance with Construction Documents, complying with the statutes of the jurisdiction in which the project is to be constructed and all other Legal Requirements. The term "Contractor" shall include those subcontractors who have a direct contract with the Contractor to perform all or a portion of the storage, handling, installation, and installation of the bracing (Temporary Installation Bracing, Permanent Individual Truss Member Bracing and Permanent Building Stability Bracing) of the Trusses.

#### **OWNER:**

Any person, agent, firm or corporation having a legal or equitable interest in the property.<sup>3</sup>

#### **PERMANENT BUILDING STABILITY BRACING:**

Bracing that is to be considered part of the lateral force resisting system for the entire building. The Permanent Building Stability bracing is bracing that transfers forces due to seismic, wind, collected structural member buckling or other external lateral forces into the shearwalls, foundation or other lateral force resisting systems that are provided for the building. The Permanent Building Stability Bracing also prevents rollover of the roof trusses. The design of the lateral force resisting system for the entire building is the responsibility of the

<sup>1</sup> For the latest professional engineering law see the following website: [www.michigan.gov/engineers](http://www.michigan.gov/engineers)

<sup>2</sup> R 408.30401 of the Michigan Administrative Code adopts by reference the 2003 International Building Code, as published by the International Code Council, Inc.

<sup>3</sup> As defined in the Section 202 of the 2003 Michigan Building Code.



Prepared with assistance from Structural Building Components Association of Michigan, a local chapter of SBCA.

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Registered Design Professional or Owner when there is no contract with a Registered Design Professional for the design of the Building Structural System.

**PERMANENT INDIVIDUAL TRUSS MEMBER BRACING:**

Bracing that is required to prevent local buckling of an individual truss chord or web member due to the compression forces in the individual truss member. The Permanent Individual Truss Member Bracing is the responsibility of the Truss Designer. In the absence of specific Permanent Individual Truss Member Bracing requirements, trusses shall be braced in accordance with the Building Component Safety Information (BCSI 1) *Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses*.

**REGISTERED DESIGN PROFESSIONAL (RDP):**

"Registered design professional" means an individual who is licensed under article 20, 1980 PA 299, MCL 339.2001.<sup>4</sup> (see Appendix C)

**STRUCTURAL ELEMENT:**

A single joist, rafter, beam, or other structural member (not including the Trusses) designed by others and supplied for the Building by either the Truss Manufacturer or others.

**TEMPORARY INSTALLATION BRACING:**

Bracing installed for the purpose of holding trusses true to line, dimension and plumb. In addition, temporary bracing holds trusses in a stable condition until permanent truss bracing and other permanent components that contribute to the overall rigidity of the roof or floor are in place. Temporary bracing may consist of ground bracing, continuous lateral sheets or ties, diagonals, crossbracing or similar items. In the absence of specific temporary bracing requirements, trusses shall be braced in accordance with the Building Component Safety Information (BCSI 1) *Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses*.

**TRUSS DESIGN DRAWING (TDD):**

A type of construction document that includes the written, graphic and pictorial depiction of each individual truss.<sup>5</sup>

**TRUSS MANUFACTURER:**

An individual or organization engaged in the manufacturing of Trusses.<sup>6</sup>

**Unique Definitions for Structures that require a RDP:**

**BUILDING DESIGNER:**

The Owner of the Building contracts with a Registered Design Professional for the design of the Building Structural System and who is responsible for the Construction Documents.<sup>7</sup>

**TRUSS DESIGN ENGINEER:**

The individual or organization responsible for the design of Trusses. Each individual truss design drawing shall bear the seal and signature of the Truss Design Engineer.<sup>8</sup>

**Unique Definitions for Structures that do not require a RDP:**

**BUILDING DESIGNER:**

The Owner of the Building or the individual or organization that contracts with the Owner for the design of the Building Structural System and/or who produces the Construction Documents.<sup>9</sup>

<sup>4</sup> As defined in the Section 202 of the 2003 Michigan Building Code.

<sup>5</sup> Definitions taken from IBC 2003, ANSI/TPI 1-2002 Chapter 2, adopted by reference in IBC 2003 (See IBC 102.4, 2303.4, 2306.1, Chapter 35), or the *Metal Plate Connected Wood Truss Handbook* published by WTCA.

<sup>6</sup> Definitions taken from IBC 2003, ANSI/TPI 1-2002 Chapter 2, adopted by reference in IBC 2003 (See IBC 102.4, 2303.4, 2306.1, Chapter 35), or the *Metal Plate Connected Wood Truss Handbook* published by WTCA.

<sup>7</sup> Adapted from IBC section 106.1.

<sup>8</sup> Adapted from IBC section 2303.4.

## TRUSS DESIGNER:

The individual or organization responsible for the design of trusses.<sup>10</sup>

### Issue:

These types of specifications, if accepted by a component manufacturer, are a specific attempt to change standard industry practices through plans and specifications language, which are part of the contract between the Registered Design Professional (RDP) and whomever is employing them for this project. There is no guarantee that the component manufacturer will see these plans and specifications in the two-step market that exists in Michigan. The following is intended to provide guidance with respect to specifications like this and the typical responsibilities each party has with respect to the design, detailing and installation of trusses per Michigan engineering law and the MBC.

### Analysis:

#### *Building Designer*

For commercial construction projects in the State of Michigan, the “Building Designer” as referenced in this *Technical Note* is the RDP who has responsibility for the overall building design in accordance with the state’s statutes and regulations governing the professional registration and certification of Architects or Engineers. According to MBC Section 106.1 (*see Appendix A*), the structural design documents shall be prepared by a RDP where required by the statutes of the jurisdiction in which the project is to be constructed.

**MBC 106.1 Submittal documents.** Construction documents, special inspection and structural programs and other data shall be submitted in 1 or more sets with each application for a permit. The construction documents shall be prepared by, or under the direct supervision of, a registered design professional when required by article 20 of 1980 PA 299, MCL 339.101 et seq. ...

**MBC 106.1.1 Information on construction documents.** Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

These documents should clearly define the scope of the project (location, nature, and extent of the work proposed).

The Building Designer is also the person who reviews and coordinates all the construction documents prepared by others to make sure they do not conflict with the scope of the project, the specifics of which are listed in the MBC Sections 106.3.4.1 and Section 1603.1 (*see Appendix A*).

**MBC 106.3.4.1 General.** ...The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building. ...

**MBC 1603.1 General.** Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets fully dimensioned. The design loads and other information pertinent to the structural design...shall be clearly indicated on the construction documents for parts of the building or structure.

On typical commercial construction projects, plans for fire alarm systems, pre-engineered trusses and sprinkler systems, etc. are not available at the time that building plans are submitted for approval. These become known as "deferred submittals" and the RDP is responsible to review these for general

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<sup>9</sup> Adapted from IBC 106.1

<sup>10</sup> Adapted from IBC 2303.4

conformance to the design of the building. This process is defined in MBC Section 106.3.4.2 (*see Appendix A*).

**MBC 106.3.4.2 Deferred submittals.** ...Documents for deferred submittal items shall be submitted to the registered design professional in responsible charge who shall review them and forward them to the building official with a notation indicating that the deferred submittal documents have been reviewed and been found to be in general conformance to the design of the building. ...

The flow of work differs depending on whether or not the building plans call for deferred truss submittals but the parties responsible for each element of the work does not. The deferred submittal process can easily break down due to poor communication back to the RDP. This is where the integration of the structural building component design into the original construction documents can be forgotten or overlooked. Often then the permanent building stability bracing design of the roof or floor system has not been reviewed and approved by the RDP.

According to ANSI/TPI 1-2002 (TPI 1) Chapter 2 (*see Appendix B for pertinent text*), which is adopted by reference in the MBC through Sections 102.4, 2303.4, and Chapter 35 “Reference Standards” provisions (*see Appendix A*), the RDP needs to provide the following information:

**ANSI/TPI 1-2002 Section 2.5.2** The Building Designer...shall provide the following:

- 2.5.2.1 All Structural Element and Truss orientations and locations;
  - 2.5.2.2 Information to fully determine all Truss profiles;
  - 2.5.2.3 All Structural Element and Truss bearing conditions;
  - 2.5.2.4 The location, direction, and magnitude of all dead and live loads applicable to each Structural Element and Truss...
  - 2.5.2.5 All Structural Element and Truss anchorage designs required to resist uplift, gravity, and lateral loads;
  - 2.5.2.6 Allowable vertical and horizontal deflection criteria and any specific criteria...
  - 2.5.2.7 Proper transfer of design loads affecting the Structural Elements and Trusses;
  - 2.5.2.8 Adequate connections between Trusses and between Structural Elements...but not Truss to Truss girder connections...
  - 2.5.2.9 Permanent bracing design for the Building...and permanent bracing for all Structural Elements and Trusses...
- 2.5.3 The Building Designer shall be responsible for the adequacy of the design of the Building Structural System [and]...shall evaluate the effect of the Trusses and the Structural Elements supplied, on the Building Structural System.

The Truss Manufacturer and Truss Designer must rely on the Building Designer to take the information provided by the Truss Design Drawing (TDD), the *Building Component Safety Information* (BCSI 1-03) ([www.sbcindustry.com/bcsi.php](http://www.sbcindustry.com/bcsi.php)) and their analysis of the flow of loads through the building to design the Permanent Building Stability Bracing system needed to keep all of the truss members from buckling out of plane simultaneously and transfer the accumulation of all buckling forces from the permanent truss member bracing system to the building’s load path system as follows (*see Appendix B*):

**TPI 1 Section 2.6.6** ...it shall be the responsibility of the Owner to engage the Building Designer or others to specify how the permanent lateral bracing is to be anchored or restrained to prevent lateral movement of all Truss members together. ...

Finally, the Michigan Act 299 of the 1980 Occupational Code (*see Appendix C*) provides guidance regarding the role of the RDP (professional engineer or architect) in ensuring that the construction project is completed pursuant to the plans and specifications as follows:

**399-2001 Definitions** "Person in responsible charge" means a person licensed under this article who determines technical questions of design and policy; advises the client; supervises and is in responsible charge of the work of subordinates; is the person whose professional skill and judgment are embodied in the

plans, designs, plats, surveys, and advice involved in the services; and who supervises the review of material and completed phases of construction.

The RDP is the construction professional that is most intimately familiar with the flow of loads through the entire building and is the only professional who can use this knowledge to ensure complete flow of load transfer and assure overall building performance success.

### ***Truss Manufacturer and Truss Designer***

The Truss Manufacturer and Truss Designer must rely on the Contractor to take the information provided by the TDD and then install all the Permanent Individual Truss Member Restraint needed to keep truss members from buckling out of plane and then properly connect this lateral restraint system to the building's load path system as specified by the Building Designer as follows:

**TPI 1 Section 2.6.6** The Truss Manufacturer and Truss Designer shall not be responsible for the design, materials, or installation of permanent bracing for the Building, including bracing for all or any of the Trusses and Structural Elements. The approximate location for, or the maximum spacing between, permanent lateral bracing (restraint) of Truss members will be indicated on the Truss Design....

The Truss Manufacturer and Truss Designer must rely on the Contractor to install the trusses safely and professionally as follows:

**TPI 1 Section 2.6.5** The Truss Manufacturer and Truss Designer are not responsible for, nor do the Truss Manufacturer and Truss Designer have control of, construction means, methods, techniques, sequences, procedures, programs and safety in connection with the handling, storing, installation and bracing of the Trusses. These topics are covered in the BCSI 1-03: Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses. The Truss Manufacturer and Truss Designer are also not responsible for the failure to carry out the construction work related to the Trusses and the Structural Elements in accordance with the handling and installation information and/or the Structural Design Documents.

The Truss Manufacturer and Truss Designer must be able to rely on Contractors to be the construction professionals that are most intimately familiar how all the materials of construction must fit together, through the plans and specifications, to transfer all the loads through the entire building to the foundation. Their expertise is critical to overall building performance success.

### **Conclusion:**

If the Truss Manufacturer is not able to accept the responsibilities of a specification, like the one noted above, the Truss Manufacturer needs to strike through this specification as follows:

Prefabricated wood truss manufacturer shall be completely responsible for the design and manufacture , ~~detailing and installation~~ of all the individual trusses for the project. [Then list the individual items that will be provided to the company that is contracted with to supply trusses for.] ~~including bracing, connections and special reinforcement.~~

And make sure all parties involved in the project know the clear and specific scope of work that will be undertaken. The Truss Manufacturer's staff members that are responsible for signing contracts and purchase orders need to fully understand these types of responsibility issues and the policies of their company with respect to these issues as they respond to them.

If a Truss Manufacturer is prepared to accept one or more of the responsibilities outlined in a note like the one above, a very clear scope of work statement needs to be created and signed off on.

Each and every item mentioned in the above note has its own responsibilities and liabilities either clearly stated or implied. Design and detailing the bracing, connections and special reinforcement are clearly

professional engineering services. Installation of all truss including bracing, connections and special reinforcement becomes an installation subcontractor service.

Regardless of the type of specification, when properly compensated for these services a Truss Manufacturer may decide to expand their scope of services to accommodate current customer needs more comprehensively. It is suggested that if a Truss Manufacturer is considering providing a portion of or the entire building design function as a service, consideration be given to ensuring that one complies with Michigan engineering laws and has the proper insurance coverage and license. Following the governing law and having the proper insurance also holds true for adding installation services to your business offering.

Ultimately, if undertaken professionally, a Truss Manufacturer providing building design, component manufacturing and installation services has the potential to provide the customer with a very cost effective solution. In this scenario, the building design can be performed once, no conservative loading assumptions will need to be used, and the design can account for efficient installation.

## Appendix A

The language in RED signifies sections of the code or law that have been used in the foregoing document to make it easier for the reader to see the language in context.

Michigan Department of Labor and Economic Growth  
Bureau of Construction Codes & Fire Safety  
2003 Michigan Building Code (MBC)

### Chapter 1 ADMINISTRATION SECTION 102: APPLICABILITY

102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

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### SECTION 106: CONSTRUCTION DOCUMENTS

106.1 Submittal documents. Construction documents, special inspection and structural programs and other data shall be submitted in 1 or more sets with each application for a permit. The construction documents shall be prepared by, or under the direct supervision of, a registered design professional when required by article 20 of 1980 PA 299, MCL 339.101 et seq. Where special conditions exist, the building official is authorized to require additional construction documents to be prepared by a registered design professional.

106.1.1 Information on construction documents. Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

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#### 106.3.4 Design professional in responsible charge.

##### 106.3.4.1 General.

When it is required that documents be prepared by a registered design professional, the building official shall be authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge. If the circumstances require, the owner shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The building official shall be notified in writing by the owner if the registered design professional in responsible charge is changed or is unable to continue to perform the duties.

The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittals items, for compatibility with the design of the building.

Where structural observation is required by Section 1709, the inspection program shall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur (see also duties specified in Section 1704 ).

106.3.4.2 Deferred submittals. For the purposes of this section, deferred submittals are defined as those portions of the design that are not submitted at the time of the application and that are to be submitted to the building official within a specified period. Deferral of any submittal items shall have the prior approval of the building official. The registered design professional in responsible charge shall list the deferred submittals on the construction documents for review by the building official. Documents for deferred submittal items shall be submitted to the registered

design professional in responsible charge who shall review them and forward them to the building official with a notation indicating that the deferred submittal documents have been reviewed and been found to be in general conformance to the design of the building. The deferred submittal items shall not be installed until the design and submittal documents have been approved by the building official

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## Chapter 16 STRUCTURAL DESIGN

### SECTION 1603 CONSTRUCTION DOCUMENTS

**1603.1 General.** Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets fully dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.8 shall be clearly indicated on the construction documents for parts of the building or structure.

**Exception:** Construction documents for buildings constructed in accordance with the conventional light-frame construction provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof live loads.
  2. Ground snow load,  $P_g$ .
  3. Basic wind speed (3-second gust), miles per hour (mph) (km/hr) and wind exposure.
  4. Seismic design category and site class.
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## Chapter 23 WOOD

### SECTION 2303: MINIMUM STANDARDS AND QUALITY

**2303.4 Trusses.** Metal-plate-connected wood trusses shall be manufactured as required by TPI 1. Each manufacturer of trusses using metal plate connectors shall retain an approved agency to make unscheduled inspections of truss manufacturing and delivery operations. The inspection shall cover all phases of truss operations, including lumber storage, handling, cutting fixtures, passes or rollers, manufacturing, bundling and banding.

**2303.4.1 Truss design drawings.** Truss construction documents shall be prepared by a registered design professional and shall be provided to the building official and approved prior to installation. These construction documents shall include, at a minimum, the information specified below. Truss shop drawings shall be provided with the shipment of trusses delivered to the job site.

1. Slope or depth, span, and spacing;
2. Location of all joints;
3. Required bearing widths;
4. Design loads as applicable;
5. Top chord live load (including snow loads);
6. Top chord dead load;
7. Bottom chord live load;
8. Bottom chord dead load;
9. Concentrated loads and their points of application;
10. Controlling wind and earthquake loads;
11. Adjustments to lumber and joint connector design values for conditions of use;
12. Each reaction force and direction;
13. Metal connector plate type, size, thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface;
14. Lumber size, species and grade for each member;
15. Connection requirements for:
  - 15.1 Truss-to-truss girder;
  - 15.2 Truss ply-to-ply; and
  - 15.3 Field splices.
16. Calculated deflection ratio and/or maximum description for live and total load;

17. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss drawing or on supplemental documents; and
18. Required permanent truss member bracing location.

Chapter 35 REFERENCED STANDARDS

<b>TPI</b>	Truss Plate Institute 583 D'Onofrio Drive, Suite 200 Madison, WI 53719	
	Standard reference number	Title
TPI 1—2002	National Design Standards for Metal-Plate-Connected Wood Truss Construction .....	Referenced in code section number 2303.4, 2306.1

## Appendix B

ANSI/TPI 1-2002

National Design Standard for Metal Plate Connected Wood Truss Construction

Chapter 2 – Standard Responsibilities in the Design Process Involving Metal Plate Connected Wood Trusses

### 2.2 CONTRACTURAL AGREEMENTS

The provisions of Chapter 2 are intended to apply where no specific contractual relationship exists between the parties addressed herein, pertaining to Design Responsibilities. This section is not intended to take precedence over contractual relationships developed between any of the parties involved in a particular construction project.

### 2.4 REQUIREMENTS OF BUILDING OWNER, AND QUALIFICATIONS OF BUILDING DESIGNER AND CONTRACTOR

The Owner shall be responsible to comply with any requirements from a Jurisdiction that the design and/or construction of a building be performed by a specially qualified person, such as a Registered Design Professional or a Contractor with a specific type of license. The Owner shall be responsible for all matters of the design and construction of the Building Structural System except as defined in this chapter and any applicable contractual agreement.

### 2.5 BUILDING STRUCTURAL SYSTEM DESIGN DOCUMENTS

2.5.1 The Building Designer, through the Structural Design Documents shall provide that the Structural Elements and Trusses shall not be subjected to adverse influences including, but not limited to moisture, temperature, and corrosive chemicals and gases. This provision shall specifically include notice for the Truss Designer of environments expected to result in wood moisture content exceeding 19 percent, and temperatures and/or corrosion potential that are unusually high relative to typical wood buildings.

2.5.2 The Building Designer, through the Structural Design Documents shall provide information sufficiently accurate and reliable to be used for facilitating the supply of the Structural Elements and for developing the design of the Trusses for the Building, and shall provide the following:

2.5.2.1 All Structural Element and Truss orientations and locations;

2.5.2.2 Information to fully determine all Truss profiles;

2.5.2.3 All Structural Element and Truss bearing conditions;

2.5.2.4 The location, direction, and magnitude of all dead and live loads applicable to each Structural Element and Truss including, but not limited to, loads attributable to: roof, floor, partition including any directions other than given in ANSI/TPI 1-2002, mechanical, fire sprinkler, attic, storage, rain loads and ponding, design wind speed and exposure category, snow, snow drift, unbalanced snow load, and seismic forces;

2.5.2.5 All Structural Element and Truss anchorage designs required to resist uplift, gravity, and lateral loads;

2.5.2.6 Allowable vertical and horizontal deflection criteria and any specific criteria per ANSI/TPI 1-2002;

2.5.2.7 Proper transfer of design loads affecting the Structural Elements and Trusses;

2.5.2.8 Adequate connections between Trusses and between Structural Elements, including Truss to Structural Element connections, but not Truss to Truss girder connections except such connections that are excluded from the scope of the Truss Designer's responsibilities.

2.5.2.9 Permanent bracing design for the Building, including bracing to resist wind, seismic, or other lateral forces, and permanent bracing for all Structural Elements and Trusses. The permanent bracing design shall

incorporate the continuous lateral chord and web member bracing that is designated on the individual Truss Design Drawings into the overall bracing for the entire Building Structural System.

- 2.5.3 The Building Designer shall be responsible for the adequacy of the design of the Building Structural System or the adequacy of the Structural Design Documents. The Building Designer shall evaluate the effect of the Trusses and the Structural Elements supplied, on the Building Structural System.

## 2.6 CONSTRUCTION RELATED ITEMS

- 2.6.1 Truss Submittals and Structural Element Submittals, and any supplemental information provided by the Truss Manufacturer, shall be provided to the Contractor or the individual or organization responsible for the installation of the Trusses and Structural Elements.
- 2.6.2 The Building Designer shall be responsible for determining appropriate field storage, handling, and installation measures for the Trusses and Structural Elements. The Contractor, unless otherwise specifically assigned by Contract, shall determine the requirements of, and provide all materials for construction in accordance with the Structural Design Documents. These requirements and materials for construction shall include all necessary items for safe construction, including design and installation of, adequate temporary bracing during construction for the Building Structural System.
- 2.6.3 The Contractor shall be responsible, unless otherwise assigned by Contract, to review or inspect Trusses delivered or to review and inspect Trusses after erection for any problems, including dislodged/missing connectors, cracked, dislodged or broken members, or any other damage that may impair the structural integrity of the Truss. In the event that damage to the Truss is discovered that would likely impair the structural integrity of the Truss, the Contractor shall be responsible to ensure that the Truss not be erected and that any area within the Building supported by any such Truss already erected shall be appropriately shored or supported to prevent further damage from occurring and shall remain clear and free of any load imposed by people, plumbing, electrical, mechanical, bridging, bracing, etc. until such field repairs have been properly completed. In the event of such damage and unless otherwise specified by Contract, the Contractor shall contact the appropriate design professional to determine an adequate field repair and the Contractor shall be responsible to construct any such field repair.
- 2.6.4 All Truss repairs shall be approved in writing by a Building Designer or a Truss Designer or other qualified person prior to the performance of the repair.
- 2.6.5 The Truss Manufacturer and Truss Designer are not responsible for, nor do the Truss Manufacturer and Truss Designer have control of, construction means, methods, techniques, sequences, procedures, programs and safety in connection with the handling, storing, installation and bracing of the Trusses. These topics are covered in the BCSI 1-03: *Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses*. The Truss Manufacturer and Truss Designer are also not responsible for the failure to carry out the construction work related to the Trusses and the Structural Elements in accordance with the handling and installation information and/or the Structural Design Documents.
- 2.6.6 The Truss Manufacturer and Truss Designer shall not be responsible for the design, materials, or installation of permanent bracing for the Building, including bracing for all or any of the Trusses and Structural Elements. The approximate location for, or the maximum spacing between, permanent lateral bracing of Truss members will be indicated on the Truss Design and it shall be the responsibility of the Owner to engage the Building Designer or others to specify how the permanent lateral bracing is to be anchored or restrained to prevent lateral movement of all Truss members together. Consideration shall be given to one of the following methods for providing this restraint or anchorage: (a) permanent diagonal bracing in the plane of the Truss members; or (b) other means when demonstrated by the Building Designer or other qualified person to provide equivalent lateral resistance.

## Appendix C

### Michigan Statutes – Act 299 of the 1980 Occupational Code Article 20 339.2001 Definitions.

Sec. 2001. As used in this article:

(a) "Architect" means a person who, by reason of knowledge of mathematics, the physical sciences, and the principles of architectural design, acquired by professional education and practical experience, is qualified to engage in the practice of architecture.

(b) "Firm" means a sole proprietorship, partnership, corporation, or limited liability company through which a person licensed under this article offers or provides a service to the public.

(c) "Person" means a natural person notwithstanding section 105(5).

(d) "Person in responsible charge" means a person licensed under this article who determines technical questions of design and policy; advises the client; supervises and is in responsible charge of the work of subordinates; is the person whose professional skill and judgment are embodied in the plans, designs, plats, surveys, and advice involved in the services; and who supervises the review of material and completed phases of construction.

(e) "Practice of architecture" means professional services, such as consultation, investigation, evaluation, planning, design, or review of material and completed phases of work in construction, alteration, or repair in connection with a public or private structure, building, equipment, works, or project if the professional service requires the application of a principle of architecture or architectural design.

(f) "Practice of professional surveying" means providing professional services such as consultation, investigation, testimony, evaluation, planning, mapping, assembling, and interpreting reliable scientific measurements and information relative to the location, size, shape, or physical features of the earth, improvements on the earth, the space above the earth, or any part of the earth, and the utilization and development of these facts and interpretations into an orderly survey map, plan, report, description, or project. The practice of professional surveying includes all of the following:

(i) Land surveying that is the surveying of an area for its correct determination or description for its conveyance, or for the establishment or reestablishment of a land boundary and the designing or design coordination of the plotting of land and the subdivision of land.

(ii) Geodetic surveying that includes surveying for determination of the size and shape of the earth both horizontally and vertically and the precise positioning of points on the earth utilizing angular and linear measurements through spatially oriented spherical geometry.

(iii) Utilizing and managing land information systems through establishment of datums and local coordinate systems and points of reference.

(iv) Engineering and architectural surveying for design and construction layout of infrastructure.

(v) Cartographic surveying for making maps, including topographic and hydrographic mapping.

(g) "Practice of professional engineering" means professional services, such as consultation, investigation, evaluation, planning, design, or review of material and completed phases of work in construction, alteration, or repair in connection with a public or private utility, structure, building, machine, equipment, process, work, or project, if the professional service requires the application of engineering principles or data.

(h) "Principal" means a sole proprietor, partner, the president, vice-president, secretary, treasurer, or director of a corporation, or a member or manager of a limited liability company.

(i) "Professional engineer" means a person who, by reason of knowledge of mathematics, the physical sciences, and the principles of engineering, acquired by professional education and practical experience, is qualified to engage in the practice of professional engineering.

(j) "Professional surveyor" means a person who, by reason of knowledge of law, mathematics, physical sciences, and techniques of measuring acquired by professional education and practical experience, is qualified to engage in the practice of professional surveying.

(k) "Services" means professional service offered or provided by an architect in the practice of architecture, a professional engineer in the practice of professional engineering, or a professional surveyor in the practice of professional surveying.



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