Note to Specifier: This document is published by Sterling Solutions. Orange text contains notes to the specifier and is not intended to be included in the final specifications. Bold text contains potential specification language suggested to be finalized for the project.

SECTION 06 17 15 – Cross-Laminated Timber PanELS

1. GENERAL
	* + 1. SUMMARY
				1. Section includes:

Cross-laminated timber panels (CLT) manufactured from:

Sawn lumber laminations.

Structural composite lumber (SCL) laminations.

Connectors, fasteners, and other installation accessories.

Shop-fabrication, including shop machining for connectors.

Shop-applied finishes.

Erection.

Cleaning.

* + - * 1. Related Requirements:

Retain, remove or modify the following articles to coordinate with the project needs.

**[Section 06 18 11 “Glued-Laminated Timber Framing.”]**

Retain the following article if notes in Structural Contract Documents contain panel requirements such as structural design criteria for delegated design.

**[General Structural Notes in Structural Contract Documents for structural design criteria.]**

* + - 1. DEFINITIONS
				1. Cross-Laminated Timber (CLT) Panels: Prefabricated engineered wood products made of at least three orthogonal layers of graded sawn lumber or structural composite lumber (SCL) that are laminated by gluing with structural adhesives.
				2. Structural Composite Lumber (SCL): Laminated Strand Lumber (LSL), Laminated Veneer Lumber (LVL), Oriented Strand Lumber (OSL), and Parallel Strand Lumber (PSL) engineered wood products, created by layering dried and graded wood with structural adhesives into billets or lamellas for use in panel fabrication.
				3. Manufacturing: The process of assembling layers of individual lumber pieces with structural adhesives or fasteners to form rectangular mass timber panels of specified length, width, and thickness, for use as structural members.
				4. Fabrication: The cutting and tooling of manufactured mass timber panels to dimensions and detailing required for final assembly in Project.
				5. AOR: Architect of Record for Project.
				6. SEOR: Structural Engineer of Record or Professional Engineer of Record in responsible charge of the structural design for Project.
			2. REFERENCES

Retain the following as appropriate and modify the version appropriate to the applicable building code requirements.

* + - * 1. APA – The Engineered Wood Association (APA)

ANSI A190.1-2022 – Standard for Wood Products – Structural Glued Laminated Timber.

ANSI/APA PRG 320-2019 – Standard for Performance-Rated Cross-Laminated Timber.

ANSI/APA 405-2023 – Standard for Adhesives for Use in Structural Laminated Timber.

* + - * 1. American Wood Council (AWC)

AWC NDS-2024 – National Design Specification (NDS) for Wood Construction.

AWC SDPWS-2021 Special Design Provisions for Wind and Seismic (SDPWS)

* + - * 1. American Society of Civil Engineers (ASCE)

ASCE/SEI 7-2022 – Minimum Design Loads and Associated Criteria for Building and Other Structures.

* + - 1. SUBMITTALS FOR APPROVAL
				1. Product Reports: For each type of product indicated.

Certificate of Conformance: Issued by a qualified testing and inspecting agency documenting that CLT panels comply with ANSI/APA PRG 320.

* + - * 1. Samples: Submit three samples of CLT panel, with factory sealer or finish, as applicable. Size 10x10 inches.
				2. Quality Assurance Submittals: Refer to Quality Assurance articles for qualification requirements.

Manufacturer’s qualifications.

Preinstallation conference minutes.

* + - * 1. Shop Drawings:

Supplier shall provide shop drawing submittal including the following information:

Installation drawings

Indicate member locations, orientation, elevations, and spacing. Label each mass timber panel with a piece number or other unique mark.

Indicate the locations of additional structural elements supporting or integrated with the mass timber panels.

Indicate the size and shape of openings in mass timber panels, horizontally positioned relative to gridlines in plan, and vertically positioned relative to floor levels in elevation.

For each panel:

Show layout, dimensions, major strength direction, and elevations.

Clearly indicate species, layup, and shop-applied products and finishes.

Include dimensioned details of cuts, openings, holes, fasteners, and locations of pre-installed connection hardware.

Provide estimated weight of each panel based on calculation by volume, approximate moisture content, and wood species.

Provide center of gravity coordinates and designated lift points of each panel (where applicable).

Acceptance of shop drawing submittal with no changes noted will serve as approval for manufacture and fabrication.

* + - 1. SUBMITTALS FOR INFORMATION
				1. Method Statements:

Weather and Moisture Protection Method Statement: Submit for record a written statement of the means and methods employed to monitor and manage the effects of exterior exposure on the CLT during construction.

* + - 1. QUALITY ASSURANCE
				1. Certify CLT Panels to ANSI/APA PRG 320.
				2. Manufacturer’s Qualifications:

Certification: Manufacturer of CLT shall be pre-qualified to manufacture panels certified in accord with ANSI/APA PRG 320.

Design Standards: Manufacturer shall comply with National Design Specification (NDS) for Wood Construction.

* + - * 1. Preinstallation Meeting

Attendees: Installer and representatives of manufacturers and fabricators involved in, or affected by, the installation of mass timber panels and its coordination or integration with other materials and installations that have preceded or will follow.

Notify Owner’s representative, AOR, SEOR and testing agency of scheduled meeting dates.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Protect mass timber panels during delivery, storage and handling with water-resistant covering, in accordance with Contractor’s Weather and Moisture Protection Plan.
				2. During shipment, support units with non-staining material in same position as during storage.
				3. Store units with adequate bracing. Protect units to prevent contact with soil and separated individual panels with dunnage, so air may circulate around all faces of mass timber panels. Take actions to prevent staining, cracking, distortion, warping or other physical damage.

Handle and transport units in a position consistent with their shape and design to avoid excessive stresses that would cause cracking or damage. Protect corners with wood blocking.

Slit underside of weather-resistant membrane covering during storage at site to avoid accumulation of condensation or moisture. Take care to preserve the underside surface of the mass timber panels.

If factory coverings have been removed, cover top and sides of units with opaque moisture-resistant membrane.

1. PRODUCTS
	* + 1. Performance Requirements
				1. Structural Performance: CLT panels shall meet or exceed minimum design valuesrequired in Contract Documents without exceeding design stresses, and deflection requirements determined according to the applicable building code and the AWC NDS and acceptable to authorities having jurisdiction.
			2. CLT PANEL MANUFACTURERS
				1. Sterling Structural
				2. **[Other Approved Manufacturers:]**

**<*Manufacturer’s Name*>.**

**<*Manufacturer’s Name*>.**

**<*Manufacturer’s Name*>.**

* + - 1. CROSS-LAMINATED TIMBER PANELS (CLT)
				1. Manufacturer shall have ANSI/APA PRG 320 certification for layups required by Contract Documents.
				2. CLT Grade and Layup Requirements:

CLT Grade and Layup: As agreed by AOR, SEOR and mass timber panel manufacturer.

CLT Layup Species: **[Southern Pine] [SPF-S] [Eastern Hemlock]**

Number of Layers: **[Three] [Five] [Seven]**

Panel Thickness, Structural: **[4.125 in.] [ 6.875 in.] [ 9.625 in.]**

Structural gluing of lamination edge joints isnot required.

Side pressing CLT during manufacturing isrequired.

* + - * 1. Adhesives: Provide adhesive products in compliance with ANSI/APA PRG 320.
				2. Appearance Classifications for CLT of Lumber Laminations:

Architectural Appearance Classification: For locations where mass timber panels are indicated on the Construction Documents to meet the Architectural Appearance Classification, the face layers exposed to view shall meet the following requirements.

All knot holes and voids measuring over 3/4 inch (19 mm) are filled with a wood-tone filler or clear wood inserts selected for similarity with the grain and color of the adjacent wood.

The case layers exposed to view are free of loose knots and open knot holes are filled.

Knot holes do not exceed 3/4 inch (19 mm) when measured in the direction of the lamination length with the exception that a void may be longer than 3/4 inch (19 mm) if its area is not greater than 1/2 inch2 (323 mm2).

Voids greater than 1/16 inch (1.6 mm) wide created by edge joints appearing on the face layers exposed to view are filled.

Exposed surfaces are surfaced smooth with no misses permitted.

The following requirements can apply to panels that are not exposed to view and where no appearance requirements are needed beyond the structural grade requirements of the laminations used in the panels.

Non-Visual Appearance Classification: For locations where mass timber panels are **[not indicated on the Construction Documents to meet any other Appearance Classification][not exposed to view in the final construction]**, the face layers exposed to view shall meet the following requirements:

Shake and checks allowed, not limited.

Heart wood and blue stain allowed, not limited.

Occasional misses, low laminations or wane (limited to the lamination grade) are permitted on the surface layers and are not limited in length.

Knots (limited to the lamination grade) are permitted.

* + - 1. ACCESSORIES
				1. Fasteners:

Steel Angles: **[ASTM A36, galvanized per ASTM A123]** **[As specified in Section 05 50 00 “Metal Fabrications”]**.

Nails: Conform to ASTM F1667.

Wood Screws: Conform to ASME B18.6.1.

Proprietary Self-Tapping Screws: Conform to third-party product evaluation report from an approved agency.

* + - * 1. Wrapping Material: Weatherproof and lightproof material to protect mass timber panels from moisture and light damage.
				2. Adhesive Sealing Tape at Panel Joints and Ends: For protection of mass timber panels from movement of water down through mass timber system and from moisture at concrete during topping slab placement and curing.
			1. MANUFACTURING
				1. Manufacture panels in a temperature-controlled facility. Pre-heating lamination stock is not permitted.
				2. Mass Timber Panel Manufacturing Tolerances:

Thickness: Plus or minus 1/16 inch (1.6 mm)

Width: Plus or minus 1/8 inch (3.2 mm).

Length: Plus or minus 1/8 inch (6.4 mm).

Squareness: Lengths of two panel face diagonals measured between panel corners shall not differ by more than 1/8 inch (3.2 mm).

Straightness: Deviation of edges from straight line between adjacent panel corners shall not exceed 1/16 inch (1.6 mm).

* + - 1. FABRICATION
				1. Fabricate mass timber panels with approved connection details, as indicated in reviewed shop drawings.
				2. Mark mass timber panels for identification during erection. Clearly mark one side of panel with the piece number.
			2. FINISHES
				1. Apply two coats of Sansin KP-12 to all edges of penetrations, holes, openings, and perimeter edges of mass timber panels within an enclosed, weather-protected finishing and storage space.

Retain the following if a shop-applied finish is required. Coordinate with Sterling.

* + - * 1. **[Apply one coat of Sansin KP-12 to visual faces of panels.]**

Retain the following if a shop-applied membrane is required. Coordinate with Sterling.

* + - * 1. **[Shop-Applied Weather Protection Membrane: Vaproshield]**
1. EXECUTION
	* + 1. EXAMINATION
				1. Prior to site erection, examine site conditions and ensure acceptable conditions for erection.
				2. Examine locations to receive mass timber panels, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Bracing and Temporary Shoring: Follow installation method statement and bracing plan, including evaluation of temporary loading conditions and bracing of structure during installation.
			3. INSTALLATION
				1. General: Comply with installation method statement and bracing plan.
				2. Erect mass timber panels in accordance with engineered rigging plans and in coordination with reviewed shop drawings.
				3. Follow Project’s Weather and Moisture Protection Plan throughout construction period, until building is enclosed.
				4. Make adequate provision for possible erection stresses. Set panels level and plumb to correct positions. Securely brace panels and anchor in place to maintain plumb until permanently secured by finished structure.

Do not load floors or roof with equipment or materials that exceed design capacity of the structure without approval of SEOR.

* + - * 1. Mass timber panels shall fit closely and accurately, without trimming, cutting or other modifications.

Site cutting or boring of panels, other than shown in reviewed shop drawings is not permitted without written consent ofSEOR and AOR.

* + - * 1. Join mass timber panels along edges using joint connection indicated in structural construction drawings.
				2. Gap between adjacent mass timber panels 1/8-inch on all sides unless otherwise noted in Shop Drawings.
			1. CLEANING
				1. Clean exposed surfaces of mass timber panels after erection and completion of field touch up.

Clean all exposed surfaces.

Perform cleaning procedures, as necessary, according to mass timber panel manufacturer’s written recommendations and as instructed by AOR. Protect other work from staining or damage due to cleaning operations.

Repair water and rust stains.

Do not use cleaning materials or processes that could change the appearance of exposed mass timber panels or damage adjacent materials.

* + - 1. ADJUSTING
				1. Repair damaged surfaces and finishes of mass timber panels following erection. Replace damaged mass timber panels if repairs are not approved by AOR **[SEOR][ and][ SSEOR]**.
			2. PROTECTION
				1. Protect installed mass timber panels from damage during construction, including protection in accordance with Contractor’s Weather and Moisture Protection Plan.

Prevent standing water from accumulating on mass timber panel faces.

Adhere to Contractor’s Weather and Moisture Protection Plan for retention of wrappings on mass timber panels until immediately prior to installation.

Slit underside of wrapping to prevent accumulation of moisture inside wrapping.

END OF SECTION