

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 06 17 00 - Shop Fabricated Timber Framing.
- .3 Section 06 12 10 - Structural Insulated Panels.
- .4 Section 06 17 53 - Prefabricated Wood Trusses.
- .5 Section 06 20 00 - Finish Carpentry.
- .6 Section 06 40 00 - Architectural Woodwork.
- .7 Section 06 40 23.10 - Wood Ceilings.
- .8 Section 07 27 00\_01 - Air Barriers and Vapour Retarders.
- .9 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- .10 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .11 Section 10 22 26\_33 - Folding Panel Partitions.
- .12 Section 10 28 10 - Toilet and Bath Accessories.

### **1.02 REFERENCE STANDARDS**

- .1 Canadian Roofing Contractors' Association (CRCA)
  - .1 CRCA Roofing Specification Manual, 2012.
- .2 ASTM International
  - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .3 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM C954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  - .5 ASTM D1165-13, Standard Nomenclature of Commercial Hardwoods and Softwoods.

- .6 ASTM D1761 12, Standard Test Methods for Mechanical Fasteners in Wood.
- .7 ASTM D3931-08(2015), Standard Test Method for Determining Strength of Gap-Filling Adhesive Bonds in Shear by Compression Loading.
- .8 ASTM D5456-14b, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .9 ASTM E1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
- .10 ASTM F1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .3 CSA International
  - .1 CAN/CSA O80-Series-15, Wood Preservation.
  - .2 CSA O86-14, Engineering Design in Wood.
  - .3 CSA O112-Series M1977 (R2006), CSA Standards for Wood Adhesives.
  - .4 CSA O121-08(R2013), Douglas Fir Plywood.
  - .5 CSA O141-05(R2014), Softwood Lumber.
  - .6 CSA O151-09(R2014), Canadian Softwood Plywood.
  - .7 CAN/CSA O325-16, Construction Sheathing.
  - .8 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.
  - .9 CSA S16-14, Design of steel structures.
  - .10 CSA W47.1-09 (R2014), Certification of companies for fusion welding of steel.
- .4 Canadian Commission on Building and Fire Codes/National Research Council of Canada
  - .1 National Building Code of Canada (NBC), edition adopted and currently enforced by the Province of Prince Edward Island.
- .5 National Research Council Canada (NRC)
  - .1 National Building Code of Canada (NBC), edition adopted and currently enforced by the Province of Prince Edward Island.
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .7 The Truss Plate Institute of Canada
  - .1 TPIC 2014, Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses.

- .8 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC S102 10, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

### **1.04 QUALITY ASSURANCE**

- .1 Lumber identification: Grade stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: Grade mark in accordance with applicable CSA standards.
- .3 Each board of fire retardant treated material to shall bear the ULC label indicating 'Flame Spread Classification' (FSC), and smoke developed.

### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Deliver wood products bundled or crated to provide adequate protection during transit. Inspect wood products for damage upon delivery and remove and replace damaged materials.
- .4 Store materials a minimum of 150 mm off the ground on blocking. Keep materials under cover and dry. Provide for air circulation within and around stacks and under temporary coverings.
- .5 Protect sheet materials to prevent breaking of corners and damage to surfaces.

## **2 PRODUCTS**

### **2.01 GRADES**

- .1 Use CLS grade marked lumber conforming to the Standard Grading Rules for Canadian Lumber published by the National Lumber Grades Authority.

### **2.02 FRAMING STRUCTURAL AND PANEL MATERIALS**

- .1 Lumber: kiln-timberdried, Structural Light Framing and Structural Joists and Planks to CAN/CSA 0141, softwood, S-P-F, S4S, graded and stamped in accordance with National Lumber Grading Association (NLGA) Standard Grading Rules for Canadian Lumber and as follows:
  - .1 Moisture Content: maximum 8% at time of installation.
  - .2 Maximum moisture content when used for attachment of drywall: 8%.
  - .3 Grade: No. 2 or better, and having the following minimum properties:
    - .1 Sizes: 38 mm or 89 mm wide by depth as indicated on drawings.
    - .2 Bending at extreme fibre ( $F_b$ ): 11.8 MPa.
    - .3 Longitudinal shear ( $F_v$ ): 1.0 MPa.
    - .4 Compression parallel to grain ( $F_c$ ): 11.5 MPa.
    - .5 Compression perpendicular to grain ( $F_{cp}$ ): 4.6 MPa.
    - .6 Tension parallel to grain ( $F_t$ ): 5.5 MPa.
    - .7 Modulus of elasticity ( $E/ E_{05}$ ): 9500/6500.

### **2.03 PANEL MATERIALS**

- .1 Sheathing for structural shear wall and diaphragms:
  - .1 Plywood: Douglas Fir (DFP) Sheathing Grade to CSA 0121, thickness as indicated on drawings.
  - .2 OSB: Oriented Strand Board panels to CSA 0437, Grade O-2, thickness as indicated on drawings. Grade stamp shall indicate span rating. Grade O-2 material may be used thickness for thickness on the same spans as plywood.

- .2 Underlayment:
  - .1 Plywood to CSA O325, 10 mm thick S1S, with no knot fillers detrimental to areas to receive finish floor indicated.
  - .2 OSB to CSA O325, 11 mm thick, sanded surface, Grade O-1 with no adhesives detrimental to areas to receive finish floor indicated.
- .3 Other sheathing:
  - .1 Plywood or Oriented Strand Board (OSB) panels to CSA O325, thickness as indicated. Use Exterior Grade materials at exterior building shell locations (e.g., roof and walls).
- .4 All Panels: no added urea formaldehyde.

## **2.04 MISCELLANEOUS LUMBER**

- .1 Provide lumber for support or attachment of other construction, including furring, blocking, nailing strips, ground, rough bucks, cants, curbs, fascia, backing sleepers, and similar members.
- .2 Fabricate miscellaneous lumber from dimension lumber of sizes indicated, and into shapes shown on drawings.
- .3 Moisture Content: 19% maximum for lumber items not specified to receive wood preservative treatment.
- .4 Grade: for dimension lumber sizes provide No. 2 or Standard grade lumber per NLGA. For board-sized lumber, provide sheathing grade, S2S.

## **2.05 ACCESSORIES**

- .1 Metal framing connectors and hangers: prefabricated steel products tested or designed in accordance with CSA O86.1 and CSA S16.1. Finish: hot dipped galvanized post-fabrication, all sides, to ASTM A123.
- .2 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .3 General purpose adhesive: to CSA O112 Series, moisture-resistant Type I. Maximum allowable VOC limit 70 g/L in accordance with SCAQMD Rule 1168.
- .4 Nails, spikes, and staples: to ASTM F1667, suited to construction application and conditions.

- .5 Screws for Fastening to Cold-Formed Metal Framing:  
ASTM C954, except with wafer heads and reamer wings, length  
as recommended by screw manufacturer for material being  
fastened.
- .6 Rough Hardware (bolts, nuts, washers, etc.): hot dip  
galvanized in conformity to CSA G164 or Grade A low carbon  
steel, conforming to ASTM A307.
  - .1 Bolts: 13 mm diameter unless indicated otherwise,  
complete with nuts and washers
- .7 Joist hangers: minimum 1 mm thick sheet steel, galvanized  
ZF001 coating designation.
- .8 Nailing discs: flat caps, minimum 25 mm diameter, minimum  
0.4 mm thick, fibre, formed to prevent dishing. Bell or cup  
shapes not acceptable.
- .9 Proprietary fasteners: toggle bolts, expansion shields and  
lag bolts, screws and lead plugs, recommended for purpose  
by manufacturer.
- .10 Subflooring Adhesive: moisture-resistant Type I.
- .11 Roof sheathing H-Clips: formed "H" shape, thickness to suit  
panel material, extruded 6063-T6 aluminum alloy or hot  
dipped galvanized steel.
- .12 Acceptable wood sheathing auxiliary subfloor fasteners:
  - .1 Flat head #8 wood screws, Robertson square drive,  
straight roots, 5/8 inch (16 mm) long, sufficient to  
penetrate through 3/8-inch (9.5 mm) thick top layer of  
sheathing into bottom layer of sheathing approximately  
1/4-inch (6 mm), countersunk flush with surface (but  
no deeper); ensure screws do not penetrate through  
bottom layer of sheathing into acoustic underlayment.
- .13 Sill Gaskets: rubberized, moisture-resistant, 3 mm thick  
closed cell neoprene strip, or 8 mm thick open cellular  
rubber reinforced with solid rubber particles bonded to  
cellulose, minimum 28 mm (1-1/2 inch) wide, with  
self-sticking permanent adhesive on one face, lengths as  
required.

## **2.06 CHEMICAL PRESSURE TREATMENTS**

- .1 Where lumber or plywood is indicated as preservative  
treated or is specified to be treated, treated in  
accordance with CAN/CSA O80.9M.

- .2 Wood preservatives containing arsenic or chromium are not permitted.
- .3 Pressure treat above ground items with waterborne preservatives to minimum retention of 4.0 kg/m<sup>3</sup>. After treatment, kiln-dry lumber and plywood to maximum moisture content of 19% and 15% respectively. Treat indicated items and the following:
  - .1 Wood cants, nailing strips, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapour barriers, and waterproofing.
  - .2 Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry and concrete.
  - .3 Wood framing members less than 460 mm above grade.
  - .4 Wood floor plates installed over concrete slabs directly in contact with earth.
- .4 Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to minimum of 6.4kg/m<sup>3</sup>.
- .5 Fire-Retardant Treatment: to CAN/SCA O80.9M, CAN/CSA O80.20M and CAN/CSA O80.27M, pressure impregnated, and as follows:
  - .1 Flame Spread Classification: FSC 25 maximum.
  - .2 Smoke developed of not more than: 75.
- .6 Complete fabrication of treated items before treatment where possible. If cut after treatment apply field treatment to cut surfaces.
- .7 Wood Preservatives: Maximum allowable VOC limit 350 g/L in accordance with SCAQMD Rule #1113 - Architectural Coatings.

## **2.07 FASTENER FINISHES**

- .1 Fastener Finishes, including but not limited to nails, spikes, staples, screws, nailing discs, proprietary fasteners:
  - .1 Galvanizing: to ASTM A653, double hot dipped galvanized for pressure preservative and fire retardant treated materials; hot dipped galvanized for all other purposes.
  - .2 Stainless steel: use stainless steel Type 316 alloy for fasteners that penetrate or are in contact with cedar shingles or are in the watershed path of cedar shingle rain runoff.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.02 PREPARATION**

- .1 Treat surfaces of material with wood preservative before installation.
- .2 Apply preservative by dipping or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Preservative treat material as follows:
  - .1 Wood cants, fascia backing, curbs, nailers, and sleepers on roof deck.
  - .2 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.
- .5 Fire-retardant treat electrical equipment mounting boards and panels and as additionally or otherwise indicated.

#### **3.03 INSTALLATION**

- .1 Comply with requirements of National Building Code of Canada (NBC) supplemented by the requirements of this Section. Use dust collectors and high quality respirator masks when cutting or sanding wood panels, and lumber or panels treated with preservative or fire-retardant treated materials.
- .2 Install members true to line, with levels and elevations square and plumb. Install Sill Gaskets at all concrete-to-wood interfaces to prevent direct contact between wood and concrete.



- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with crown-edge up.
- .5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Install subflooring and combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.
  - .1 In addition to mechanical fasteners, secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.
  - .2 Allow for a 1/32 inch gap between subflooring panels when installing wood board flooring to accommodate swelling with increased moisture content.
  - .3 Install subflooring with the strength axis perpendicular to the flooring joists.
  - .4 Do not use sealer or drywall compound to fill cracks and dents in the subfloor.
  - .5 Ensure that the subflooring panels are flat. Sand any joints that have raised edges because of edge swell.
  - .6 Use a moisture-vapour retarder between the subflooring and the finish wood flooring to prevent moisture from leaching through the joists and subfloor to negatively affect the finish wood floor above.
- .7 Install wall sheathing in accordance with manufacturer's printed instructions.
- .8 Install roof sheathing in accordance with requirements of National Building Code of Canada (NBC).
- .9 Install blocking at locations indicated to support washroom accessories and sliding door hardware.
- .10 Install furring and blocking as required to space-out and support other work as required.
- .11 Install furring to support board wall finishes where there is no blocking and where sheathing is not suitable for direct nailing.
  - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.

- .12 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using fasteners with finish as specified in this Section.
- .13 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .14 Countersink bolts where necessary to provide clearance for other work.
- .15 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

### **3.04 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.05 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 17 00 - Shop Fabricated Timber Framing.
- .2 Section 06 17 53 - Prefabricated Wood Trusses.
- .3 Section 06 20 00 - Finish Carpentry.
- .4 Section 06 40 23.10 - Wood Ceilings.
- .5 Section 07 21 19 - Foamed-in-Place Insulation.
- .6 Section 07 31 29.10 - Wood Shingles and Shakes.
- .7 Section 07 52 00 - Modified Bituminous Membrane Roofing.
- .8 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .9 Section 07 92 00 - Joint Sealants.
- .10 Section 08 11 00 - Metal Doors and Frames.
- .11 Section 08 14 76 - Aluminum-Clad Wood Bi-Fold Doors.
- .12 Section 08 52 13.10 - Aluminum-Clad Windows.

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute/National Particleboard Association (ANSI/NPA)
  - .1 ANSI/NPA A208.1-2009, Particleboard.
- .2 American Society of Civil Engineers (ASCE) Publications
  - .1 ASCE 7 - Minimum Loads for Buildings and Other Structures.
- .3 APA The Engineered Wood Association Publications
  - .1 DOC PS2 - Performance Standard for Wood-Based Structural-Use Panels.
  - .2 APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels
- .4 ASTM International
  - .1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.
  - .2 ASTM A47/A47M-99(2014), Standard Specification for Ferritic Malleable Iron Castings.

- .3 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .4 ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- .5 ASTM A653/A653M-15e1. Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .6 ASTM C578-15b, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .7 ASTM C1289-16, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .8 ASTM D1761-12, Standard Test Methods for Mechanical Fasteners in Wood.
- .9 ASTM D2559-12ae1, Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.
- .10 ASTM D5055-16, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .11 ASTM E72-15, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- .12 ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .13 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.
- .14 ASTM F1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .5 CSA International
  - .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).
  - .2 CAN/CSA O80 SERIES-15, Wood Preservation.
  - .3 CSA O86-14, Engineering Design in Wood.
  - .4 CSA O112.9-10 (R2014), Evaluation of Adhesives for Structural Wood Products (Exterior Exposure), Includes Update No. 1 (2011).
  - .5 CSA O121-08(R2013), Douglas Fir Plywood, Includes Update No. 1 (2013).
  - .6 CSA O141-05(R2014), Softwood Lumber.
  - .7 CSA O151-09(R2014), Canadian Softwood Plywood.
  - .8 CSA O325-16, Construction Sheathing.
  - .9 CSA S347-14, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
  - .10 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.

- .11 CSA S16-14, Design of steel structures.
- .12 CSA W47.1-09 (R2014), Certification of companies for fusion welding of steel.
- .6 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber January 2014.
- .7 Canadian Commission on Building and Fire Codes/National Research Council of Canada
  - .1 National Building Code of Canada (NBC), edition adopted and currently enforced by the Province of Prince Edward Island.
- .8 Canadian Construction Materials Centre (CCMC) Publications
  - .1 CCMC Technical Guide - Stressed Skin Panels (with structural ribs) for Walls and Roofs.
- .9 ICC-ES Acceptance Criteria
  - .1 ICC-ES AC04 - Acceptance Criteria for Sandwich Panels.
  - .2 ICC-ES AC05 - Acceptance Criteria for Sandwich Panel Adhesives.
  - .3 ICC-ES AC12 - Acceptance Criteria for Foam Plastic Insulation.
- .10 The Truss Plate Institute of Canada
  - .1 TPIC-2007, Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses, Errata and Revisions.
- .11 Underwriters' Laboratories (UL)
  - .1 UL 790-04, Standard Test Methods for Fire Tests of Roof Coverings.
- .12 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
  - .2 CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  - .3 CAN/ULC S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .4 CAN/ULC S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .5 CAN/ULC S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Convene pre-demolition meeting 2 weeks prior to beginning selective demolition Work at barn structure, with primary trades and Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
  - .1 Verify project requirements.
  - .2 Review building, foundation, structural system and substrate conditions.
  - .3 Coordination construction schedule and with other building subtrades.
  - .4 Review requirements of Contract and intended outcomes.
  - .5 Review SIP manufacturer's installation instructions and warranty requirements.

### **1.04 DESIGN REQUIREMENTS**

- .1 Review manufacturer's installation guide and design manual.
- .2 Provide Structural Insulated Panels (SIP) that have been designed, manufactured, fabricated and installed to withstand specified loads in accordance with design drawings and the NBC, and to maintain performance criteria as stated by the SIP manufacturer without defects, damage or product failure.
- .3 The design shall meet or exceed the requirements of the NBC and CSA O86.
- .4 Refer to Structural Drawings for design loads.

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 SIP Code Compliance: Provide code report for SIP with evidence of compliance with code requirements for alternate method of construction per applicable code. Submit current compliance report number from ICC ES showing conformance to the IBC and IRC and from CCMC showing conformance to the NBC. Code report shall include confirmation of compliance with applicable evaluation criteria.

- .2 EPS Code compliance: Provide evaluation report for EPS insulation with evidence of compliance with applicable code. Submit current compliance report numbers from ICC ES showing conformance to the IBC and IRC and from CCMC showing conformance to the NBC. Code report shall include confirmation of compliance with applicable evaluation criteria.
- .3 Submit manufacturer's instructions, printed product literature, Design Handbook, and technical datasheets for SIP and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Prince Edward Island, Canada.
  - .2 SIP Design Engineer is responsible for the SIP panel design including but not limited to:
    - 1. Panel design to support gravity load,
    - 2. Panel connection design,
    - 3. Diaphragm design to support lateral loads, and
    - 4. Connection details of framing comments attached to the SIP.
  - .3 Submit SIP shop drawings showing fully dimensioned fabrications and installation details, panel layout, elevations, SIP connection details, product components and accessories.
  - .4 Submit erection drawings in accordance with CSA O86.
  - .5 Calculations: Provide structural calculations prepared by a design professional registered in the Province of Prince Edward Island, Canada, upon which the engineered shop drawings are based.
- .4 Quality Assurance Submittals: Submit the following:
  - .1 Third-Party Quality Control: Provide proof of manufacturer participation in recognized third party certification program to assure conformance with SIP system specified performance characteristics and physical properties.
  - .2 Submit copy of third party certification label demonstrating that manufacture of panels complies with specified performance characteristics and physical properties.
  - .3 Submit manufacturer-specific installation instructions for SIP system.

- .5 Fire Resistant Assemblies: submit Intertek Testing Services or equal assembly listing for testing per CAN/CSAS101 confirming required fire resistance rating.
- .6 Warranty: Provide limited warranty documents as specified herein.

#### **1.06 QUALITY ASSURANCE**

- .1 All SIPs used in wall construction shall be identified by grade mark and/or certificate of inspection issued by an approved agency. The identification shall have the following minimum requirements:
  - .1 Manufacturer Identification (such as name or logo).
  - .2 Quality Assurance Agency Identification (such as name or logo).
  - .3 Conformance with this Specification Section.
- .2 Manufacturer shall have been manufacturing SIPs for minimum 5-years and show evidence of quality control program consistent with ISO 9001:2008 Quality Management System Requirements using a Process approach.
- .3 Fabricator for welded steel connections shall be certified in accordance with CSA W47.1.
- .4 Delegated Design: engage services of Professional Engineer licenced in Province of PEI to perform structural analysis and design SIP assemblies in accordance with design loads.
- .5 Installer Qualifications: Installer to have demonstrated experience acceptable to SIP Manufacturer for installation work similar in scope and size to this project. Manufacturer to confirm availability of site advisory service.
- .6 Field Measurements: Request field measurements prior to completion of shop drawings and fabrication. Coordinate fabrication schedule with construction progress to avoid delay of work.
- .7 Source limitations: Obtain all SIPs through one source and from a single manufacturer. All accessories shall be furnished or recommended by the SIP manufacturer.
  - .1 Each SIP component required shall be supplied or recommended by SIP manufacturer and shall be obtained from the selected SIP manufacturer through its approved supplier.



- .2 Provide evidence of Third Party Certification and labeling of all insulation used in the manufacturing of SIPs.
- .3 SIP manufacturer shall provide lamination, R-value (RSI-value) and warranty documents to Departmental Representative for acceptance and execution.

#### **1.07 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Ordering: Comply with SIP manufacturer ordering instructions and lead time requirements to avoid construction delays.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood from deterioration and damage.
  - .3 Replace defective or damaged materials with new.
  - .4 Protection: SIPs shall be fully protected from the weather. Protect against exposure to rain, water, dirt, mud, and other residue that may affect SIP performance. Cover stored SIPs with breathable protective wraps. Sips shall be stored in a protected area.

#### **1.08 WARRANTY**

- .1 SIP Manufacturer Warranty: Submit SIP manufacturer standard warranty document for execution by an authorized company official. SIP Manufacturer Limited Warranty is in addition to and not a limitation of other rights the Owner may have under Contract Documents.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Factory Fabricated SIP Panel Construction:
  - .1 Core: Foil faced polyisocyanurate insulation to CAN/ULC S704, Type 1, LTTR of RSI 1.05/25 mm minimum, flame spread classification of 500 or less in accordance with CAN/ULC S102. Insulation manufacturer shall be identified with label of accredited Third Party Certification agency. The foil face shall be at the interior (warm side) face of the SIP.
  - .2 Exterior and Interior Facing: Oriented Strand Board (OSB) conforming to CSA 0437 - a performance rating mark shall be identified on the panel with an Exposure '1' durability rating; minimum physical properties shall be tested and described in DOC PS2, APA PRP-108 and CSA 0325.0. The minimum physical properties for use in SIP System shall be approved by SIP manufacturer.
  - .3 Adhesives shall be in conformance with ICC ES AC05 - Acceptance Criteria for Sandwich Panel adhesive, and to ASTM D2559.

### **2.02 ACCESSORIES**

- .1 Splines:
  - .1 Dimensional lumber for use in joining SIPs shall be supplied by the SIP manufacturer as specified on engineered SIP shop drawings.
- .2 Fasteners:
  - .1 Fasteners (such as screws) used for the connection of SIP wall to wood members as specified in this document shall be corrosion resistant, have threaded or drill point and shall be sized to penetrate a minimum of 1 inch (25.4 mm) into the wood member to which the SIP assembly is being attached as shown in Figure 6.3. SIP Fasteners shall meet the following requirements:
    - .1 Nominal thread diameter 0.255 inch (7 mm).
    - .2 Nominal shank diameter 0.190 inch (5 mm).
    - .3 Nominal head diameter 0.625 inch (16 mm).
  - .2 SIP fasteners shall have a minimum edge distance of 1-9/16 inch (40 mm) and a maximum edge distance of 2-7/8 inch (73 mm).
  - .3 Galvanized screws, nails or staples shall be permitted for spline and plate attachments.

- .3 SIP Sealants:
  - .1 Sealants shall be specifically designed for use with SIPs. Sealant shall be compatible with all components of the SIP. Sealant shall be supplied or recommended by the SIP manufacturer.
- .4 SIP Panel Seal Tape:
  - .1 Tape with an adhesive suitable for indoor use, minimum 6" (152 mm) wide for use on flat SIP joints and minimum 12" (304 mm) wide for use on opposing angled surfaces including ridge and roof-to-wall connections. SIP tape shall be supplied or recommended by SIP manufacturer.
- .5 Lumber to Section 06 10 00 - Rough Carpentry: kiln-dried Eastern White Pine No. 2 or better, moisture content not to exceed 19%.
- .6 Miscellaneous air sealing, to Section 07 21 19 - Foamed-in-Place Insulation.
- .7 Caulking: to Section 07 92 00 - Joint Sealants, commercial-grade, compatible with SIP joint materials and construction.

## **2.02 FABRICATION**

- .1 Panel sizes shall be fabricated in accordance with engineered shop drawings. Maximum panel size shall be 2440 mm x 7320 mm (8' X 24'). Fabrication tolerances shall comply with values in manufacturer product specification.
- .2 Panel Construction:
  - .1 Exterior Face:  $\geq 7/16"$  (11 mm) OSB (exterior grade).
  - .2 Core: Foil faced polyisocyanurate insulation with design LTTR RSI  $\geq 3.5$ .
  - .3 Interior Face:  $\geq 7/16"$  (11 mm) OSB (exterior grade).
  - .4 Length: longest practicable, up to 16' (4877 mm), to suite site conditions and construction.
  - .5 OSB panels shall be structurally laminated to core. Adhesive, to ASTM D2559.
  - .6 Overall panel thickness shall be 114 mm (4.5 inches).
- .3 Fire Performance Rating: Intertek Testing Services or equal assembly listing for testing per CAN/CSA S101 to required fire resistance rating.

- .4 Fabricate SIPs for walls with 19 mm x 89 mm Eastern White Pine, Kiln Dried, strapping factory-fastened (glued and mechanically fastened) to interior face of SIPs, strapping to run vertical to floor, spaced apart at 24" centres. Coordinate with Section 06 20 00 - Finish Carpentry regarding Eastern White Pine board and batten interior wall finish.
- .5 Fabricate SIPs for roof with 19 mm x 89 mm Eastern White Pine, Kiln Dried, strapping factory-fastened (glued and mechanically fastened) to interior face of SIPs, strapping to run vertical (90°) to eave, spaced apart at 24" centres. Coordinate with Section 06 40 23.10 - Wood Ceilings regarding Eastern White Pine tongue and groove interior wall finish.
- .6 Cut SIPs to accurate lengths, angles, and sizes to produce close fitting joints.
- .7 Remove foam as required to accommodate wood blocking and splines.
- .8 Provide electrical wiring chases in foam core where required.

### **3 EXECUTION**

#### **3.01 MANUFACTURER INSTRUCTIONS**

- .1 Compliance: Comply with SIP manufacturer CCMC evaluation reports, published load design charts, construction assembly drawings, signed and sealed engineered shop drawings, manufacturer's wall and roof installation manuals, and product data, including technical bulletins and product information bulletins for design and installation.
- .2 Deviations from standard details or load design values shall be calculated for the specific use and the calculations and details shall be signed and sealed by a registered design professional and provided to the manufacturer prior to fabrication.

#### **3.02 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied. Commencement of work means acceptance of conditions.

### **3.03 INSTALLATION**

- .1 Hoist SIPs in place by lifting equipment suited to size of panels. Exercise care to prevent damage to SIPs.
- .2 Install SIPs plumb, square and true to line.
- .3 Fill all panel joints with expanding urethane foam or seal by other approved method.
- .4 SIP Support: For wall SIPs, hold sill plate back from edge of deck 13 mm to provide full bearing of both OSB skins. Provide adequate bracing of SIPs during panel erection. Remove debris from plate area prior to application of sealant and SIP placement.
- .5 Electrical: Provide 38 mm diameter access holes in top and bottom plating to align with electrical wire chases in SIPs. Align all horizontal electrical chases in SIPs and maintain debris free electrical chases.
- .6 SIP wall penetrations: internal vertical chase penetration in SIP core to maximum side dimension of 50 mm centred in panel core. Maximum 2 horizontal chases permitted in each panel, one at 350 mm and one at 1220 mm from bottom of panel.
  - .1 The maximum allowable penetration size in a SIP wall panel shall be limited to a 12-inch (305 mm) circular or 12-inch by 12-inch (305 mm x 305 mm) rectangular section. Over-cutting of holes in facing panels shall not be permitted without an approved, engineered, stamped design.
- .7 SIP Fastening: Connect SIPs using screws or nails as shown on approved engineered shop drawings. Where manufacturer supplied SIP Screws are used, a minimum of 38 mm of penetration is required into wood support.
- .8 SIP Sealant: joint sealant shall be installed in a continuous bead at all connections and joints.

- .9 SIP Tape: Apply SIP tape at joints between roof SIPs, at the roof-to-wall connection and at the ridge. Tape shall only be installed after all spline connections are completed in accordance with SIP manufacturer's installation instructions.
- .10 Vapour Retarders and Air Barriers: to Section 07 27 00.01 - Air Barriers - Descriptive.
- .11 Thermal Barriers: Interior surface of SIPs shall be finished with a minimum 15-minute thermal barrier, such as 13 mm thick gypsum wallboard, nominal 25 mm solid wood paneling, or other approved materials or combination of materials. Apply approved thermal barrier according to requirements of applicable building code.
  - .1 Refer to Section 06 20 00 - Finish Carpentry.
- .12 Restrictions: Do not install SIPs directly or in contact with concrete/earth. Do not install plumbing in a SIP without consulting SIP manufacturer. Do not over-cut panel skins for approved field-cut openings. Do not cut skins to install electrical chases. Do not expose EPS core of SIPs to any solvents or solvent-based adhesives.
- .13 Remove and replace any SIP wall or roof panels that have become wet or damaged before proceeding with the installation of additional SIPs or other work that may cover a compromised SIP.
- .14 Miscellaneous air sealing at penetrations and gaps, to Section 07 21 19 - Foamed-in-Place Insulation.

### **3.04 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Coordinate manufacturer's services with Section 01 45 00 - Quality Control. Have manufacturer review work involved in handling, installation / application, protection of its products, and submit written reports, in acceptable format, to verify compliance of work with Contract.
  - .2 Manufacturer's field services: provide manufacturer's field services, consisting of installation recommendations and periodic site visits for inspection of installation in accordance with manufacturer's instructions.
  - .3 Sealant testing, to paragraph 3.07 Field Adhesion Testing, Section 07 92 00 - Joint Sealants.

- .4 Schedule site visits:
  - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
  - .2 At 60% completion, and again upon completion of Work of this Section, but before siding and roofing work commences.
- .2 Obtain reports within 3 days of review and submit immediately to Departmental Representative.

### **3.05 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.06 PROTECTION**

- .1 Protection: Protect installed product from exposure and damage during construction.
  - .1 Wall or Roof SIP Temporary Protection: Protect SIPs from weather with temporary protection at the end of each day or when rain or snow is imminent. Apply wall or roof sheathing membrane to exposed panel faces as soon as practical after installation.
  - .2 After installation is complete, cover SIPs to prevent contact with excessive water on all exposed SIP edges and faces.
  - .3 Wall or Roof SIP Cladding: Cladding design shall include a second line of defense based upon the anticipated wind-driven rain, snow and ice condition for the geographical location, building code requirements and cladding manufacturer requirements.
  - .4 Roof SIP: Roofing material shall only be installed on a dry SIP roof with a moisture content of 17% or less.

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- .2 Repair damage to adjacent materials caused by SIP installation.

**END OF SECTION**



## **PART 1 GENERAL**

### **1.01 WORK INCLUDED**

- .1 Work includes furnishing labor, materials, and equipment to design, furnish, and install structural and architectural timber framing as detailed in drawings or specified, including structural design of timber frame system, joinery, and connections not provided in drawings, and supplying associated fasteners to complete system and connect timber framing members to structural supports.
- .2 Types of timber construction specified in this section include the following:
  - .1 Beams, girders, and purlins/rafters.
  - .2 Columns and posts.
  - .3 Timber trusses.
  - .4 Solid wood decking.

### **1.02 RELATED WORK**

- .1 The following sections are related to work of this section:
  - .1 Section 06 10 00 - Rough Carpentry.

### **1.03 REFERENCES**

- .1 ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod 60000 PSI Tensile Strength.
  - .2 ASTM E488/E488M-15, Standard Test Methods for Strength of Anchors in Concrete Elements.
  - .3 ASTM B633-15, Standard Specification for Electrodeposited Coatings on Zinc on Iron and Steel.
  - .4 ASTM A575-96(R2013)e1, Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
  - .5 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar.
  - .6 ASTM A1011/A1011M-15, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon,
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Structural, High Strength Low-Alloy, High-Strength Low Alloy with Improved Formability and Ultra-High Strength.

- .7 ASTM A668/A668M-16, Standard Specification for Steel Forging, Carbon and Alloy, for General Industrial Use.
- .8 ASTM D5933-96(R2013), Standard Specification for 2-5/8" and 4" Dia. Metal Shear Plates for Use in Wood Construction.
- .9 ASTM A36-2014, Standard Specification for Carbon Structural Steel.
- .10 ASTM A276-16a, Standard Specification for Stainless Steel Bars and Shapes.
- .11 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .12 ASTM A153/A153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .13 ASME B18.6.1-1981 (R2016), Wood Screws (Inch Series).
- .14 ASME B18.2.1-2012, Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).

#### **1.04 DELIVERY, STORAGE, AND HANDLING**

- .1 Schedule timber delivery and installation to avoid extended on-site storage.
- .2 Keep timber members dry during delivery and storage. Cover timber with weathertight tarps. Do not store members in areas of high or low relative humidity.
- .3 Cut and stack timber so as not to encourage growth of sap-stain fungi, mold, carpenter ants, borers, etc.
- .4 Stack timbers with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

#### **1.05 SUBMITTALS**

- .1 Shop Drawings: Submit for review shop drawings signed
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and sealed by a professional engineer registered in the Province of Prince Edward Island. Show design loads, material properties, full dimensions of each member, and layout of timber frame system. Show large-scale details of joints and connections. Provide hardware cut sheets and design values for fasteners.

- .2 Samples: provide full width and depth, 600mm long, showing range of variation expected in appearance, including surface texture and finish of wood products.

## **1.06 QUALITY ASSURANCE**

- .1 Timbers must be graded by lumber grading agency certified by National Lumber Grading Authority (NLGA).
- .2 Locate grade stamp on timber surfaces not exposed to view in completed work. Grade certification can be submitted in lieu of grade stamping material.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- .1 General: Comply with PS 20 and grading rules of lumber grading agencies certified by American Lumber Standards Committee Board of Review as applicable.
    - .1 Factory mark each item of timber with grade stamp of grading agency.
    - .2 For exposed timber indicated to receive stained or natural finish, apply grade stamps to surfaces not exposed to view, or omit grade stamps and provide certificates of grade compliance issued by grading agency.
  - .2 Preservative Treatment:
    - .1 For sawn products, pressure treat timbers as required in architectural and structural drawings and within this section with preservative treatment to comply with AWPA U1-04 Use Category System, Commodity Specification A, Sawn Products.
      - .1 List products to be treated.
      - .2 Products to be treated before fabrication.
      - .3 Specify conditioning (air dry, kiln dry, etc.), packaging, and handling after treating.
      - .4 Specify treatment for post-treating fabrication.
-

- .2 For posts, pressure treat poles as required in architectural and structural drawings and this section with preservative treatment to comply with AWP A U1-04 Use Category System, Commodity Specification B, Posts.
  - .1 List products to be treated.
  - .2 Products to be treated before fabrication.
  - .3 Specify conditioning (air dry, kiln dry, etc.), packaging, and handling after treating.
  - .4 Specify treatment for post-treating fabrication.
- .3 For fire-retardant timber, pressure treat material as required in architectural and structural drawings and this section with treatment to comply with AWP A U1-04 Use Category System, Commodity Specification H, Fire Retardants.

## 2.02 TIMBER

- .1 Timber Species and Grade: Eastern White Pine, Northern species, No. 1 or better.
  - .2 Grading Rules: NLGA.
  - .3 For large (250mm or greater maximum dimension) members, use box heart timbers. Do not use timber with excessive reaction wood.
  - .5 Dressing: Provide dressed timber (S4S) unless otherwise indicated.
  - .7 Incising: To be performed by treater for pressure treated products.
  - .8 End Sealer: Manufacturer's standard, transparent, colorless wood sealer effective in retarding transmission of moisture at cross-grain cuts and compatible with finish.
  - .9 Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer compatible with finish.
  - .10 Cut members indicated as curved in drawings from stock having similar natural curves. Cross grain deviation greater than 1 in 10 is not permitted unless member is identified in the drawings as decorative only.
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## **2.03 PEGS**

- .1 Use straight grain peg material with slope of grain not greater than 1:15, clear white oak.
- .2 Pegs to be uniform dowels.

## **2.04 WEDGES**

- .1 Use straight-grain wedge material with slope of grain not greater than 1:15. Wedge material to be clear white oak.

## **2.05 FASTENERS**

- .1 General: Provide fasteners of size and type complying with requirements specified for material and manufacture.
    - .1 Where fasteners are exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide Type 304 stainless steel.
  - .2 Wood Screws: to ASME B18.6.1.
  - .3 Proprietary Fasteners:
    - .1 RSS structural screws by GRK or accepted equivalent.
    - .2 Timberlok fasteners by FastenMaster or accepted equivalent.
    - .3 Strong Drive screws (SDS) by Simpson Strong-tie or accepted equivalent.
    - .4 WFC/WFR/WFD fasteners by SFS intec or accepted equivalent.
  - .4 Lag Bolts: ASME B18.2.1.
  - .5 Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.
  - .6 Threaded Rods: to ASTM A36.
  - .7 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing in accordance ASTM E488, performed by a
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qualified independent testing and inspecting agency.

- .1 Material: Carbon-steel components, zinc-plated to comply with ASTM B633, Class Fe/Zn 5.
- .8 Other proprietary connectors:
  - .1 Timberlinx steel connectors by Timberlinx, Division of Michael Preston Distributors Limited.

## **2.06 STEEL CONNECTION MATERIALS**

- .1 Unless otherwise indicated, fabricate steel connection materials and steel elements from the following materials:
  - .1 Structural-steel shapes, plates, and flat bars complying with ASTM A36.
  - .2 Round steel bars complying with ASTM A575, Grade M1020.
  - .3 Hot-rolled steel sheet complying with ASTM A1011, Structural Steel, Type SS, Grade 33.
  - .4 Stainless steel plate and flat bars complying with ASTM A666, Type 304.
  - .5 Stainless steel bars and shapes complying with ASTM A276, Type 304.
  - .6 Stainless steel sheet complying with ASTM A666, Type 304.
- .2 Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A668/A668M.
- .3 Use shear plates 100mm in diameter, complying with ASTM D5933.
- .4 Finish:
  - .1 Where exposed to weather, hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123/A123M or ASTM A153/A153M.

## **2.07 FABRICATION**

- .1 Shop fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.
    - .1 Finish exposed surfaces to provide smooth finish. Surface texture shall be equivalent to that produced by machine sanding with No. 120 grit sandpaper.
    - .2 Where preservative-treated members are specified,
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fabricate before treatment to greatest extent possible. Where fabrication must be done after treatment, apply field-treatment preservative to comply with AWWPA M4.

.1 Use inorganic boron treatment for members not in contact with ground and continuously protected from water.

.2 Use copper naphthenate treatment for members in contact with ground or not continuously protected from water.

- .2 Camber: Fabricate horizontal members and inclined members with slope of less than 1:1 with natural convex bow (crown) up to provide camber.
  - .3 Seal Coat: After fabricating and surfacing each unit, apply saturation coat of penetrating sealer on surfaces of each unit except for treated wood where treatment included water repellent.
  - .4 Timber sizes are actual dimensions prior to shrinkage. Plane, adze, or otherwise dress timber to square, uniform dimension at joinery locations. Dressed dimensions shall not be more than 1/8 inch under size indicated in drawings.
  - .5 Wane edges are permitted provided they do not exceed 1/8 of a face. Remove bark and spokeshave or plane smooth, wane edge not permitted.
  - .6 Timbers with moderate bow are permitted where their intended use will straighten them. Place crowns up for spanning members. Do not use severely bowed timbers or timbers bowed in more than one direction.
  - .7 Remove staining from soil, oil, or grease.
  - .8 Cut mortise and tenon joints so there is 6mm minimum clearance between tendon end and mortise bottom to allow for shrinkage.
  - .10 Cut 6mm chamfers on tenons on end grain edges.
  - .11 Cut joints accurately to make neat, snug fit.
  - .12 Drill peg holes to produce a tight fit at final assembly. When their location is not indicated in drawings, locate center line of hole 50mm from face of
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mortise.

- .13 If required, offset peg holes on tenon from those in mortise, or drawbore, so that by driving a tapered peg through the offset holes, joint will be drawn tightly together, or drawpinned. Offset to be 3mm for softwood timbers and 2.5mm for hardwood timber.
- .14 Layout marks and identification marks must not be visible on completed frame.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION, GENERAL**

- .1 General: Erect heavy timber construction true and plumb. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
- .2 Handle and temporarily support heavy timber construction to prevent surface damage, compression, and other effects that might interfere with indicated finish. Tools used to drive or pull joints together shall not mar finished surface of timber.
- .3 Framing adjacent to masonry: Provide 1/2-inch clearance at tops, sides, and ends of members adjacent to masonry unless otherwise indicated.
- .4 Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with finish and preservative treatment requirements for shop fabrication.
- .5 Saw off pegs protruding on exterior of frame flush. Leave interior pegs protruding. Cut off pegs with mushroomed heads below damaged area.

#### **3.02 STRUCTURAL TESTS AND INSPECTIONS**

- .1 Notify the Consultant when structural framing is complete. Have timber framing inspected and approved prior to enclosing walls, floors, roofs, or ceilings.

#### **3.03 ADJUSTING AND CLEANING**

- .1 Repair damaged surfaces and finishes after completing
-



erection. Replace damaged heavy timber construction if repairs are not approved by the Departmental Representative.

**END OF SECTION**

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## **1 GENERAL**

### **1.01 SECTION INCLUDES**

- .1 This section specifies the requirements for the design, fabrication/supply and erection of prefabricated wood I-joists, bracing and bridging for the floor joists as shown on the Drawings and as specified herein.

### **1.02 RELATED WORK**

- .1 Rough carpentry: Section 06 10 00

### **1.03 REFERENCES**

- .1 CSA O80 Series-15, Wood Preservation.
- .2 CSA O86-14, Consolidation Engineering Design in Wood.
- .3 CSA O112-10(R2014), Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .4 CSA O325-16, Construction Sheathing.
- .5 CSA O437 Series-93 (R2011), Standards on OSB and Waferboard.
- .6 CAN/CSA-O141-05(R2014), Softwood Lumber.
- .7 NLGA, Standard Grading Rules for Canadian Lumber, 2014 edition.
- .8 National Building Code of Canada, 2010.
- .9 SPS 2-2013, Special Products Standard for Machine Graded Lumber.

### **1.04 DESIGN CRITERIA**

- .1 Design wood I-joists, bracing and bridging in accordance with CSA O86, minimum uniform and minimum concentrated loadings stipulated in NBC commentary, and/or as noted on the Drawings. Use more stringent values.
- .2 Limit live load deflection to 1/360th of span.

### **1.05 SOURCE QUALITY CONTROL**

- .1 Identify lumber by grade stamp of an agency certified by

Canadian Lumber Standards Administration Board.

#### **1.06 SHOP DRAWINGS**

- .1 Submit shop drawings and erection drawings in accordance with Section 01 33 00.
- .2 Each shop drawing submission showing connection details shall bear signature and stamp of professional engineer registered or licensed in Prince Edward Island.
- .3 Indicate species, sizes, and stress grades of all lumber used as structural members. Show span, camber, configuration and spacing of members. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for each member.
- .4 Submit stress diagram or print-out of computer design indicating design load for each member. Indicate allowable load and stress increase.
- .5 Show lifting points for storage, handling and erection.

#### **1.07 DELIVERY AND STORAGE**

- .1 Store members on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of members.

### **2 PRODUCTS**

#### **2.01 MATERIALS**

- .1 Webs: oriented strand board to the following standards:
  - .1 To CAN/CSA-0437
  - .2 To CAN/CSA-0325
- .2 Flanges: Machine stress rated (MSR) lumber
  - .1 NLGA - SPS-2
- .3 Adhesives: waterproof structural adhesives
  - .1 To CSA-0112

#### **2.02 FABRICATION**

- .1 Fabricate wood I-joists in accordance with reviewed shop drawings.
- .2 Glue web panels together to form a continuous member.

- .3 Machine web panels to fit into a groove in the center of the wide face of the flange members so as to form a pressed glue joint at that junction.

### **3 EXECUTION**

#### **3.01 ERECTION**

- .1 Erect wood I-joists in accordance with reviewed erection drawings.
- .2 Indicated lifting points to be used to hoist joists into position.
- .3 Make adequate provisions for handling and erection stresses.
- .4 Exercise care to prevent out-of-plane bending of joists.
- .5 Install temporary horizontal and cross bracing to hold joists plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to joists.
- .7 Do not cut or remove any truss material without approval of the Departmental Representative.

**END OF SECTION**

## **1 GENERAL**

### **1.01 WORK INCLUDED**

- .1 This Section specifies requirements for design, supply, transporting and erecting pre-fabricated wood roof trusses, braces and bridging where shown on the Drawings and as specified herein.

### **1.02 RELATED WORK**

- .1 Rough carpentry: Section 06 10 00

### **1.03 REFERENCES**

- .1 CSA-O86-14, Engineering Design in Wood.
- .2 CAN/CSA-O141-05 (R2014), Softwood Lumber.
- .3 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel Structures.
- .4 NLGA, Standard Grading Rules for Canadian Lumber, 2014.

### **1.04 DESIGN CRITERIA**

- .1 Design trusses, bracing and bridging in accordance with CSA-O86 and NBC 2010, Part 4 requirements, normal building designation. Internal wind uplift pressures shall be determined in accordance with NBC 2010, Part 4 requirements, Category 3 building designation.
- .2 Dead load and snow loads are indicated on the design drawings. Design trusses for point loads from suspended mechanical/electrical equipment as noted on plans.
- .3 Limit combined live load and dead load deflections to 1/240th of span unless otherwise specified or indicated. Limit live load deflection to 1/360th of span unless otherwise specified or indicated.
- .4 Design and supply all truss uplift anchors (truss tie downs), including girder truss tie downs, in accordance with CSA-O86, to withstand the wind uplift loads shown on Drawings.
- .5 At truss bearing points, where allowable compression

perpendicular to the grain is exceeded, the truss manufacturer must provide bearing plates.

#### **1.05 SOURCE QUALITY CONTROL**

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

#### **1.06 QUALIFICATION OF MANUFACTURERS**

- .1 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.

#### **1.07 SHOP DRAWINGS**

- .1 Submit shop drawings and erection drawings in accordance with Section 01 33 00.
- .2 Each shop drawing submission showing connection details must bear signature and stamp of professional engineer registered or licensed in Prince Edward Island.
- .3 Indicate species, sizes, and stress grades of all lumber used as structural members. Show pitch, span, camber, design heel height, configuration and spacing of members. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for each member.
- .4 Submit stress diagram or print-out of computer design indicating design load for each member. Indicate allowable load and stress increase.
- .5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
- .6 Show lifting points for storage, handling and erection.
- .7 Show location of lateral bracing for compression members.

#### **1.08 DELIVERY AND STORAGE**

- .1 Store members on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of members.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Lumber: SPF species, No. 1 grade, softwood, S4S, with maximum moisture content of 19% at time of fabrication and to following standards:
  - .1 CAN/CSA-0141.
  - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
- .2 Fastenings: to CSA-086.
- .3 Tie-down anchors: prefabricated wood truss to top plate uplift anchors, galvanized, to resist uplift force calculated as per the National Building Code of Canada.

### **2.02 FABRICATION**

- .1 Fabricate wood trusses in accordance with reviewed shop drawings.
- .2 Provide for design camber and roof slopes when positioning truss members.
- .3 Connect members using metal connector plates.

## **3 EXECUTION**

### **3.01 ERECTION**

- .1 Erect wood trusses in accordance with reviewed erection drawings.
- .2 Indicated lifting points to be used to hoist trusses into position.
- .3 Make adequate provisions for handling and erection stresses.
- .4 Exercise care to prevent out-of-plane bending of trusses.
- .5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.

- .7 Do not cut or remove any truss material without approval of the Departmental Representative.
- .8 Provide galvanized uplift anchor(s), at each truss bearing point, to resist uplift force, calculated as per National Building Code of Canada.
- .9 Have all truss tie downs (uplift anchors), including girder truss tie downs, designed, supplied and installed by the truss supplier.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 06 12 10 - Structural Insulated Panels.
- .3 Section 06 40 00 - Architectural Woodwork.
- .4 Section 06 40 23.10 - Wood Ceilings.
- .5 Section 08 03 11 - Period Wood Doors.

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards, 2<sup>nd</sup> edition.
- .3 ASTM International
  - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM E1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
  - .3 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .4 CSA International
  - .1 CSA O141-05(R2014), Softwood Lumber.
- .5 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber, January 2014.
- .6 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC S104-15, Standard Method for Fire Tests of Door Assemblies.
  - .2 CAN/ULC S105:2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC S104.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit shop drawings.
  - .2 Indicate details of construction, profiles, jointing, fastening and other related details.
  - .3 Indicate materials, thicknesses, finishes and hardware.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Submit duplicate 300 x 300 mm samples of each type of finished wood.
- .5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

### **1.04 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .3 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN/ULC S104 and CAN/ULC S105.

### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood products from deterioration, warpage or deformation, and damage.
  - .3 Replace defective or damaged materials with new.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Tongue and Groove (Interior Wall Type IW1): rough cut Eastern White Pine, to CAN/CSA O141: graded and stamped in accordance with National Lumber Grading Association (NLGA) Standard Grading Rules for Canadian Lumber, and as follows:
  - .1 Grade: No. 2 grade or better.
  - .2 Appearance: Clear Vertical Grain Heart.
  - .3 Texture: rough cut.
  - .4 Kiln dried and steam conditioned to 10-12% MC.
  - .5 Tongue & Groove edges, jointed as indicated.
  - .6 Size: nominal 19 mm x 140 mm.
  - .7 Trim boards: Eastern White Pine to CAN/CSA O141.
- .2 Hardwood lumber: Hard Maple species, S4S, average moisture content of 6% and maximum of 9% for interior work, an average moisture content of 12% and maximum of 15% for exterior work, in accordance with following standards:
  - .1 National Hardwood Lumber Association (NHLA), select or better grade; white wood only; for transparent finish.
  - .2 AWMAC premium grade, moisture content as specified.
- .3 Softwood lumber (planks, boards, battens, trim, etc.): Eastern White Pine, Grade No. 1 or better, S4S (rough cut where indicated), moisture content 19% or less in accordance with following standards:
  - .1 CSA O141.
  - .3 NLGA Standard Grading Rules for Canadian Lumber.
  - .4 AWMAC premium grade, moisture content as specified.
  - .5 Machine stress-rated lumber is acceptable.
  - .6 Sizes: as indicated, and in accordance with reviewed shop drawings.

### **2.02 ACCESSORIES**

- .1 Nails and staples: to ASTM F1667; galvanized to ASTM A123/A123M for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.

- .2 Wood screws: steel, type and size to suit application.
- .3 Splines: wood.
- .4 Joint Sealants: in accordance with Section 07 92 00 - Joint Sealants.

## **2.03 SITE FABRICATION**

- .1 Fabricate items rigid, plumb and square, as detailed, with tight, bevelled, hairline joints. Sand work smooth, set all nails and screws. Countersink bolts and washers, fill holes with matching wood plugs.

## **2.04 FINISHES**

- .1 Finishes: to Section 09 91 00 - Painting, and as indicated. For paint finishes, confirm finish and colour with Departmental Representative prior to ordering materials and applying finishes.
- .2 Where clear, transparent finish is indicated, shop-finish lumber with transparent lacquer as directed by Departmental Representative.
  - .1 Basecoat of commercial-quality catalyzed sealing lacquer, as required for AWMAC premium grade finish.
  - .2 Two finish coats of catalyzed topcoat lacquer.
  - .3 Sand between coats per lacquer manufacturer's printed directions.
  - .4 Apply clear transparent finish at walls in Rooms D106 and D107: Eastern White Pine materials: to Section 09 91 00 - Painting, Clear finish: INT 6.3K - Polyurethane varnish - G6 finish, AWS premium grade.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied. Proceeding with work means acceptance of conditions.

### **3.02 INSTALLATION**

- .1 Discard materials that are warped, twisted, bowed, crooked or otherwise defective.
- .2 Execute finish carpentry work to AWMAC Quality Standards: premium grade.
- .3 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .4 Form joints to conceal shrinkage.

### **3.03 CONSTRUCTION**

- .1 Fastening:
  - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
  - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
  - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Room D101 Multi-Purpose Room: Fabricate and replace all existing hardwood trim and ledges with new Hard Maple hardwood trim of same profile as existing.
  - .1 Fabricate and install Hard Maple hardwood base (a.k.a., wood base) in this Room.
    - .1 Size: 19 mm x 140 mm, clear finish.
- .3 Rooms D106 and D107, Tongue and Groove Wall Finish:
  - .1 Field joints: when butt jointing, ensure joints meet on studs, blocking or furring strips.
  - .2 Fasten wood tongue and groove boards in straight, aligned lengths to strapping to the orientation shown.

- .4 Start at one corner, and use a level or plumb line to ensure that the first board is installed plumb. Trim grooved edge of first board for flush fit as required. Nail siding to horizontal blocking lines installed between studs or to furring strips.
- .5 Blind-nail to solid wood backing; toe-nailed through base of each tongue, one siding nail per bearing.
- .6 Fasteners shall not be counter sunk into material.
- .7 Corner treatment:
  - .1 Inside corners: butt siding against 2" x 2" (50 mm x 50 mm) trim strip, fitted tight.
  - .2 Outside corners: mitred.
- .8 Fasten boards to strapping using fasteners no longer than required to pass through boards and strapping, but not long enough to penetrate through the face wood panel of the SIP panels; it is critically important to not penetrate the vapour barrier in the SIP panel.
  - .1 Use one fastener at the middle of the boards at each strapping location.
- .9 Fabricate and install wood base (Easter White Pine) in these two rooms. Size: 19 mm x 140 mm. Fabricate base reveal as indicated.
- .10 Cut-outs for electrical outlets and other items shall be tight to penetration, with slight gap for expansion and contraction; the hole shall be cut so that cover plates will completely hide the hole.
- .4 Standing and running trim:
  - .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
  - .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
  - .3 Make joints in baseboard, where necessary using a 45 degrees scarf type joint.
  - .4 Install door and window trim in single lengths without splicing.
- .5 Interior and exterior frames:
  - .1 Set frames with plumb sides and level heads and sills and secure.

### **3.04 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.05 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by finish carpentry installation.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 06 10 00 - Rough Carpentry.
- .3 Section 06 20 00 - Finish Carpentry.
- .4 Section 09 21 16 - Gypsum Board Assemblies.
- .5 Section 09 91 00 - Painting.

### **1.02 REFERENCES**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
  - .3 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 ASTM International
  - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM E1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .3 ASTM D2832-92(R2011), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
  - .4 ASTM D5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
  - .5 ASTM F1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards, Edition 2 (2014) plus all errata through April 29, 2016.
- .4 Builders Hardware Manufacturers Association (BHMA)
  - .1 BHMA A156.9-2015, Cabinet Hardware.



- .5 CSA International
  - .1 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles
  - .2 CAN/CSA O80 Series-15, Wood Preservation.
  - .3 CSA O112 Series M1977 (R2006), CSA Standards for Wood Adhesives
  - .4 CSA O121-08(R2013), Douglas Fir Plywood.
  - .5 CSA O141-05(R2014), Softwood Lumber.
  - .6 CSA O151-09(R2014), Canadian Softwood Plywood.
  - .7 CAN/CSA O325-07(R2012), Construction Sheathing, Includes Update No. 1 (2008).
  - .8 CAN/CSA Z809-08, Sustainable Forest Management.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .7 International Organization for Standardization (ISO)
  - .1 ISO 14040-2006, Environmental Management-Life Cycle Assessment - Principles and Framework.
  - .2 ISO 14041-1998, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .8 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).
- .9 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 2011.
- .10 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2010.
- .11 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for architectural woodwork and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
  - .2 Indicate details of construction, profiles, jointing, fastening and other related details.
    - .1 Scales: profiles full size, details half full size.
  - .3 Indicate materials, thicknesses, finishes and hardware.
  - .4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into work.
  - .3 Submit 2 finished samples, 610 mm x 610 mm of each finish to be applied at the factory, to Departmental Representative for approval. Where materials are being matched, verify that specified materials match existing prior to submitting samples.
  - .4 Submit duplicate samples of laminated plastic for colour selection.
  - .5 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.
- .5 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

#### **1.04 QUALITY ASSURANCE**

- .1 AWMAC Architectural Woodwork Standards (AWS) and Errata shall be used to establish the minimum level of quality for this project.
- .2 Execute the work of this Section by a member of AWMAC with five years' experience in work of comparable complexity and scope.
- .3 Any reference to Custom or Premium grade in this specification shall be as defined in the AWS.
- .4 Any item not given a specific quality grade shall be Premium grade as defined in the AWS.
- .5 A copy of the AWS shall be made readily available for reference purposes on the job site.
- .6 References in this specification to part and item numbers mean those parts and items contained within the AWS.
- .7 Perform the Work in accordance with the definition of 'Good Workmanship' as defined in the AWS.
- .8 Remove and replace finish carpentry Work which does not conform to the AWS
- .9 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .10 Sustainable Standards Certification: Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA Z809 or FSC or SFI.
- .11 Plywood, particleboard, OSB and wood-based composite panels to CSA and ANSI standards.
- .12 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
    - .1 Shop-prepare one each of the following: base cabinet, wall cabinet, counter top, and shelving unit, complete with hardware and shop-applied finishes, and install on project in designated locations.

- .2 Provide minimum 1 week of notice in advance of mock-up reviews, and allow 24-hours for inspection of each mock up by Departmental Representative before proceeding further with this work.
- .3 When accepted, mock up will demonstrate minimum standard for this work. Mock up may remain as part of finished work.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .1 Protect millwork against dampness and damage during and after delivery.
  - .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and protected from the weather, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect architectural woodwork from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

### **2 PRODUCTS**

#### **2.01 MATERIALS**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 15% or less in accordance with following standards:
  - .1 CSA O141.
  - .2 CAN/CSA-Z809 or FSC or SFI certified.
  - .3 NLGA Standard Grading Rules for Canadian Lumber.
  - .4 AWMAC custom grade, moisture content as specified.
- .2 Particleboard: to ANSI A208.1, Grade M-3, minimum 750 kg/m<sup>3</sup> particleboard for countertops and shelves; having no added urea formaldehyde; clearly mark panels with grade mark in visible location; extruded particleboard having loose cores with voids will not be permitted.

- .3 High-Pressure Decorative Laminate: to ANSI/NEMA LD3; Grades and application in accordance with applicable AWS requirements and as follows:
  - .1 Constructed of multiple layers of phenolic resin-saturated kraft paper in combination with a layer of decorative melamine-saturated paper, all fused together under heat and pressure.
  - .2 Horizontal General Purpose Grade (HGS): thickness of 1.2 mm  $\pm$  0.12 mm, used on the following:
    - .1 Horizontal surfaces, unless specified otherwise.
  - .3 Vertical General Purpose Grade (VGS): thickness of 0.7 mm  $\pm$  0.10 mm, used on the following:
    - .1 Vertical surfaces, unless specified otherwise.
    - .2 Exposed portions of case bodies, including ends, divisions and bottoms.
    - .3 Exposed shelves.
    - .4 Casework Doors: exposed and semi-exposed surfaces.
    - .5 Drawer Faces: exposed and semi-exposed surfaces.
  - .4 Laminate backer grade (BKL): thickness of 0.5 mm  $\pm$  0.10 mm, used on the following:
    - .1 Concealed surface of casework backs.
    - .2 Concealed surfaces, unless specified otherwise.
  - .5 Colours: as selected by Departmental Representative from manufacturer's full range.
- .4 Nails and staples: to ASTM F1667; galvanized to ASTM A123/A123M for humid areas and for treated lumber; plain finish elsewhere.
- .5 Wood screws: brass, type and size to suit application.
- .6 Screws and bolt caps to cover heads of fasteners used to secure work to walls - pop on screw covers for 6 mm diameter screws - fabricator's choice, as approved by Departmental Representative.
- .7 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Edging:
  - .1 High Pressure Decorative Laminate Edging (e.g., at countertops, window sills, and as indicated):
    - .1 Horizontal General Purpose Grade (HGS): thickness of 1.2 mm  $\pm$  0.12 mm, colour and finish to match surface finish.
    - .2 Post-forming (VGP): maximum thickness of 1 mm, colour and finish to match surface finish.

- .9 Adhesives, use commercial grade, brush-applied adhesives only:
  - .1 Decorative laminate: polyvinyl acetate or aliphatic resin in accordance with manufacturer's recommendation for curing under pressure for bonding to wood cores, water resistant type.

## **2.02 MANUFACTURED UNITS**

- .1 Fabricate to AWMAC custom quality grade.
- .2 Countertops:
  - .1 Post-formed countertops and backsplashes of plastic laminate 0.039" on 19 mm particleboard, with backer sheet on reverse side, no added urea formaldehyde.
  - .2 Nosing to be 180 degrees, "Ultra" bullnose.
  - .3 Top of backsplash to be 90 degrees.
  - .4 Trim corners of countertops where required so adjacent cabinet doors, when fully open, do not contact the corner of the countertop.
  - .5 Adhesives used to fabricate laminated assemblies containing these products must contain no added urea formaldehyde.

## **2.03 FABRICATION**

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .3 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .4 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .5 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .6 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.

- .7 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .8 At laminate edges, chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .9 Apply laminate backing sheet to reverse side of core of plastic laminate work.

## **2.05 FINISHING**

- .1 Finish in accordance with Section 09 91 00 - Painting; exposed Eastern White Pine in Rooms 106 and 107 shall be clear finish. Confirm finish requirements with Departmental Representative prior to ordering materials.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.02 INSTALLATION**

- .1 Install architectural woodwork to Quality Standards of AWMAC custom grade.
- .2 Install prefinished millwork at locations shown on drawings.
  - .1 Position accurately, level, plumb, and straight.

- .3 Fasten and anchor millwork securely.
  - .1 Anchor to floor, walls, or ceiling using heavy duty fastening devices and hardware consistent with the building materials encountered. Do not use wood plugs. Do not use plastic plugs for ceilings or walls. Provide wall strapping as required.
- .4 Use draw bolts in countertop joints.
- .5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.
- .7 Shop-apply laminated plastic to units as indicated.
  - .1 Adhere laminated plastic over entire surface.
  - .2 Make corners with hairline joints.
  - .3 Use full sized laminate sheets.
  - .4 Make joints only where approved by Departmental Representative.
  - .5 Slightly bevel arises.
- .8 For site application, offset joints in plastic laminate facing from joints in core.

### **3.03 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Clean millwork and cabinet work inside cupboards and outside surfaces.
  - .2 Remove excess glue from surfaces.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.



### **3.04 ADJUSTING AND PROTECTION**

- .1 During and after installation adjust all hardware and operating parts as necessary to ensure smooth and proper operation.
- .2 Protect millwork and cabinet work from damage until final inspection.
- .3 Protect installed products and components from damage during construction.
- .4 Repair any marks, scratches or marring.
- .5 Remove and replace damaged, marked, or stained finish carpentry
- .6 Repair damage to adjacent materials caused by architectural woodwork installation.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 10 00 - Rough Carpentry.
- .2 Section 06 12 10 - Structural Insulated Panels.
- .3 Section 06 20 00 - Finish Carpentry.
- .4 Section 06 40 00 - Architectural Woodwork.
- .5 Section 07 27 00.01 - Air Barriers and Vapour Retarders.
- .6 Section 07 92 00 - Joint Sealants.
- .7 Section 09 91 00 - Painting.
- .8 Section 10 22 26.33 - Folding Panel Partitions.

### **1.02 REFERENCE STANDARDS**

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards, Edition 2 (2014) plus all errata through April 29, 2016.
- .2 ASTM International
  - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM E1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
  - .3 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .3 CSA International
  - .1 CSA O112 Series M1977 (R2006), CSA Standards for Wood Adhesives.
  - .2 CSA O141-05 (R2014), Softwood Lumber.
- .4 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber, January 2014.
- .5 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC S104-15, Standard Method for Fire Tests of Door Assemblies.

- .2 CAN/ULC S105:2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC S104.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit shop drawings.
  - .2 Indicate details of construction, profiles, jointing, fastening, connection to structure, hidden fastening system, and other related details.
  - .3 Indicate materials, thicknesses, finishes and hardware.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Submit duplicate 300 x 300 mm samples of each type of finished wood.
- .5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

### **1.04 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .2 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN/ULC S104 and CAN/ULC S105.
- .3 AWMAC Architectural Woodwork Standards (AWS) and Errata shall be used to establish the minimum level of quality for this project.
- .4 Any reference to Custom or Premium grade in this specification shall be as defined in the AWS.
- .5 Any item not given a specific quality grade shall be Premium grade as defined in the AWS.

- .6 A copy of the AWS shall be made readily available for reference purposes on the job site.
- .7 Perform the Work in accordance with the definition of 'Good Workmanship' as defined in the AWS.
- .8 Remove and replace finish carpentry Work which does not conform to the AWS.
- .9 Coordinate with other trades for schedule and sequence.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood products from deterioration, warpage or deformation, and damage.
  - .3 Replace defective or damaged materials with new.

## **2 PRODUCTS**

### **2.01 TONGUE AND GROOVE CEILING**

- .1 Tongue and Groove: rough cut Eastern White Pine, to CAN/CSA O141: graded and stamped in accordance with National Lumber Grading Association (NLGA) Standard Grading Rules for Canadian Lumber, and as follows:
  - .1 Grade: No. 2 grade or better.
  - .2 Appearance: Clear Vertical Grain Heart.
  - .3 Texture: rough cut.
  - .4 Kiln dried and steam conditioned to 10-12% MC.
  - .5 Tongue & Groove edges, jointed as indicated.
  - .6 Size: nominal (3/4") 19 mm x 140 mm.
  - .7 Trim boards: Eastern White Pine to CAN/CSA O141.

## **2.02 MOULDING AND TRIM**

- .1 Eastern White Pine, to CAN/CSA 0141: facia, mouldings, cornice, miscellaneous trim; graded and stamped in accordance with National Lumber Grading Association (NLGA) Standard Grading Rules for Canadian Lumber, and as follows:
  - .1 Grade: No. 2 grade or better.
  - .2 Appearance: Clear Vertical Grain Heart.
  - .3 Texture: rough cut.
  - .4 Kiln dried and steam conditioned to 10-12% MC.
  - .5 Sizes, as indicated, or otherwise required to complete the Work in accordance with the design intent.

## **2.03 ACCESSORIES**

- .1 Fasteners for solid wood ceiling, moulding and trim, to ASTM F1667:
  - .1 Blind Nails: Standard 2-inch (51mm) steel cleat nails.
  - .2 Top Nails: 15 gauge steel finish nails.
  - .3 Blind Staples: Standard 2-inch (51mm) steel staples
- .2 Joint Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .3 General purpose adhesive: to CSA 0112 Series, moisture resistant Type I.

## **2.04 FABRICATION**

- .1 Shop-fabricate to extent possible and practicable.
- .2 Site-fabricate items rigid, plumb and square, as detailed, with tight, bevelled, hairline joints. Sand work smooth, set all nails and screws. Countersink bolts and washers, fill holes with matching wood plugs.
- .3 Expansion / Contraction Movement: Assemble wood products using details that allow for expansion and contraction due to normal changes in ambient conditions for occupied, conditioned spaces.

## **2.05 FINISHES**

- .1 Eastern White Pine materials: to Section 09 91 00 - Painting, Clear finish: INT 6.3K - Polyurethane varnish - G6 finish, AWS premium grade.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied. Proceeding with work means acceptance of conditions.

#### **3.02 INSTALLATION**

- .1 Work quality: to AWS premium grade.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

#### **3.03 CONSTRUCTION**

- .1 Install Eastern White Pine ceilings at Rooms D106 and D107 in accordance with manufacturer's instructions, and to AWS premium grade. Install to orientation showing, parallel with eave line.
- .2 Drive fastener into the exposed face on the tongue side, starting where the tongue and face intersect. Countersink the fastener so it does not restrict the adjoining piece. Ensure that nails penetrate the framing member at least 38 mm. If using screws, ensure that they penetrate the framing member at least 25 mm.
- .3 Space fasteners approximately 400 mm on center. Allow a 3 mm gap at the end of any lineal run.

- .4 Moulding and Trim:
  - .1 Installation, to Architectural Woodwork Standards (AWS), Premium Grade.
  - .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
  - .3 Form joints to conceal shrinkage.
  - .4 Fastening:
    - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
    - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
    - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
    - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises

### **3.04 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.05 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by finish carpentry installation.

**END OF SECTION**