

**Part 1 GENERAL**

**1.1 REFERENCES**

- .1 ASTM International, Contractor to reference latest in force standard.
  - .1 ASTM D1761, Standard Test Methods for Mechanical Fasteners in Wood.
  - .2 ASTM D5456, Specification for Evaluation of Structural Composite Lumber Products.
- .2 Canadian General Standards Board (CGSB), Contractor to reference latest in force standard.
  - .1 CAN/CGSB-71.26, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .3 Canadian Standards Association (CSA), Contractor to reference latest in force standard.
  - .1 CAN/CSA-086 – Engineering Design in Wood.
  - .2 CSA O112 Series, CSA Standards for Wood Adhesives.
  - .3 CSA O121, Douglas Fir Plywood.
  - .4 CAN/CSA-O141, Softwood Lumber.
  - .5 CSA O151, Canadian Softwood Plywood.
  - .6 CAN/CSA-O325, Construction Sheathing.
  - .7 CAN3-O437, Standards on OSB and Waferboard.
  - .8 CSA O80.20, Fire-Retardant Treatment of Lumbering Pressure Processes. This Standard applies to the fire-retardant treatment of lumber by pressure processes. Fire-Retardant Treatment of Lumber by Pressure Processes. This is not a stand alone specification.
  - .9 CSA O80.27, Fire-Retardant Treatment of Plywood by Pressure Processes. This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes. Fire-Retardant Treatment of Plywood by Pressure Processes. This not a stand alone specification.
  - .10 CSA O322, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.
- .4 National Lumber Grades Authority (NLGA), Contractor to reference latest in force standard.
  - .1 Standard Grading Rules for Canadian Lumber.
- .5 American Wood-Preservers' Association (AWPA), Contractor to reference latest in force standard.
  - .1 AWPA M2, Standard Inspection of Treated Wood Products.
  - .2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.

**1.2 DESIGN REQUIREMENTS**

- .1 Unless otherwise noted, connections shall be designed by the Contractor to the reference Standards by the Specialty Structural Engineer registered in the province of Alberta.
- .2 Design details and connections in accordance with requirements of CAN/CSA-O86 to resist forces, moments, shears, and allow for movements indicated.
- .3 Where connections are detailed, use connection of the type and detail shown on the drawings. Modifications to the specified connection types and details will not be permitted without prior approval.
- .4 Connections for wind or seismic lateral load-resisting elements, such as bracing and drag struts, and others so noted on the structural drawings may be designed as bearing connections but shall be pre-tensioned.
- .5 Use standard connection types where connections are not detailed on the structural drawings.
- .6 Design shall be for the forces and loads shown on the drawings and shall allow for the effects of beam deflections. If forces or loads are not given, the connection shall be designed for the maximum uniform distributed load that the member can carry for the span shown.
- .7 Structural members spliced for ease of fabrication or transportation shall have splices designed to develop the full strength and stiffness of the member. Splices shall be subject to non-destructive testing. The cost for such testing shall be borne by the Contractor.
- .8 Shear connections: Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.
- .9 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Alberta, Canada for non standard connections.

**1.3 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

**1.4 SHOP DRAWINGS**

- .1 Submit "design" drawings for review summarizing the proposed connection details to be used on the project. These drawings to be prepared by, or under supervision and approved of, the Specialty Structural Engineer registered in the

province of Alberta and submitted for review before start of shop drawing production. These design drawings shall show the complete connection and:

- .1 How the connection assembly fits with the connected members.
- .2 Sizes of engineered wood products and structural composite lumber complete with connection.
- .3 Capacities of the connection.
- .4 Assumed eccentricities, lines of action of forces, etc.
- .2 Submit shop drawings prepared under direction of the Specialty Structural Engineer registered in the province of Alberta. Drawings of components and connections designed by the Contractor shall be sealed and signed by this Specialty Structural Engineer or a letter shall be submitted at the end of the project signed and sealed by this Specialty Structural Engineer. The letter shall identify what was designed by the Specialty Structural Engineer and list the final shop drawings by number with dates and revision numbers.
- .3 Shop drawings shall show complete shop and erection details necessary for fabrication and erection of the component parts of the structure, including cuts, copes, connections, holes, fasteners, splices and location, type, size and extent of all connections. Splices not shown on the shop drawings will be rejected.
- .4 Provide a shop drawing clearly locating all anchor bolts, embedded plates, baseplates, etc.
- .5 Provide setting drawings, templates and directions for the installation of anchor bolts, plates and other devices.
- .6 Review of the shop drawings is intended as an assistance to the Contractor and does not relieve the Contractor of his responsibility for the completeness or accuracy of his work and its conformance with the contract documents.
- .7 Fabrication that commences prior to shop drawing review is at the risk of the Contractor.
- .8 Clearly identify on the shop drawing all revisions, changes, or modifications.
- .9 Resubmit reviewed shop drawings where noted in the review stamp, or when the Contractor makes revisions for his own purposes.
- .10 Allow at least two (2) weeks for shop drawing review.
- .11 Structural drawings are not prepared to be used as erection or shop drawings.

## **1.5 SUPPLY OF ALTERNATE PRODUCTS**

- .1 Should the sections shown on the drawings not be procurable, or should substitution for those sections be desired, sections of equivalent strength, may be substituted if approved. In such cases full particulars, thereof must be submitted prior to the closing of Bid. Material substitutions after the closing of Bid, if accepted, will be at the Contractor's cost.

**1.6****FIELD REVIEW**

- .1 The Specialty Structural Engineer responsible for shop drawings, or the Specialty Structural Engineer's representative, shall visit the site to review in place the connections and components designed by that Specialty Structural Engineer. The Specialty Structural Engineer shall be satisfied or take steps to ensure that these connections and components substantially comply with the Specialty Structural Engineer's design. The Specialty Structural Engineer shall then provide a sealed and signed letter to this effect.
- .2 The Contractor shall advise the Specialty Structural Engineer of the scheduling of all field work pertaining to this Project. The Contractor shall permit the Specialty Structural Engineer full access to the site, for the purpose of carrying out his work and he shall provide assistance required to aid in the performance of the inspection.
- .3 Provide safe access and working areas for field review on site, as required by the Specialty Structural Engineer.
- .4 Submit field review reports within 1 week of completion of inspection.

**Part 2****PRODUCTS****2.1****BUILDING FRAMING AND STRUCTURAL MATERIALS**

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Glued end-jointed (finger-jointed) lumber is not acceptable.
- .3 Laminated Veneer Lumber (LVL) Beams in accordance with ASTM D5456: LVL 2.0E (13,800MPa) with vertical laminations and depths indicated on the structural drawings.
- .4 Roof, and Exterior Wall Sheathing to be Tongue and Groove Plywood, thickness to be indicated on the structural drawings.
- .5 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
  - .1 S4S for members receiving finishes, S2S or S4S for members not receiving finishes.
  - .2 Board sizes: Spruce, pine, fir (SPF) species, No. 2 grade or better.
  - .3 Dimension sizes: Spruce, pine, fir (SPF) species, No. 2 grade or better.
  - .4 Post and timbers sizes: Spruce, pine, fir (SPF) species, No. 2 grade or better.

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**2.2 PANEL MATERIALS**

- .1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .4 Poplar plywood (PP): to CSA O153, standard construction.

**2.3 ACCESSORIES**

- .1 General purpose adhesive: to CSA O112 Series.
- .2 Nails, spikes and staples: galvanized.
- .3 Bolts: Galvanized 12.7 mm diameter unless indicated otherwise, complete with galvanized nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer. All proprietary fasteners to be galvanized or stainless steel.
- .5 Joist hangers: minimum 1 mm thick sheet steel with galvanized ZF001 coating designation.
- .6 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material.
- .7 Vapour barrier: polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.

**2.4 FASTENER FINISHES**

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for all interior and exterior work, pressure-preservative treated lumber as indicated on drawings.

**2.5 WOOD PRESERVATIVE**

- .1 Preservative: to CSA-O80 Series, Alkaline Copper Quaternary (ACQ) tinted green.

**Part 3 Execution****3.1 PREPARATION**

- .1 Store wood products as to avoid damage and keep clean.

**3.2 FRAMING MEMBERS**

- .1 Comply with requirements of NBC Part 9 supplemented by following paragraphs.

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- .2 Install members true to line, levels and elevations, square and plumb. Erect all framing materials forming sub-surfaces for wood finishes, drywall, etc. to be straight in any plain with a tolerance of 6 mm in 3 m non cumulative.
- .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 Ensure that all members are framed, anchored, tied and braced together to provide the strength and rigidity necessary for their end purposes.
- .7 Ensure that at least 50% of length of fasteners penetrate wood materials to which fasteners are secured.
- .8 Secure exterior stud wall sole plates bolted on foundations in strict accordance with design requirements.
- .9 Brace all framing temporarily in place, until braced by complete framing and sheathing.
- .10 Construct openings in stud walls wider than stud spacing by doubling jamb studs with full length cripples having full bearing at bottom of opening and providing minimum 38 mm full bearing for lintel.
- .11 Construct lintels over openings in stud walls with framing lumber set on edge and continuous solid lumber or fir sheathing plywood spacer, spiked together to make up full stud wall thickness, as indicated on structural drawings.
- .12 Provide built-up stud columns at each bearing for built-up timber beam unless noted otherwise. Each built-up column shall consist of the same number of wood studs as the number of wood framing members in each built-up timber beam, unless otherwise noted.
- .13 Double up sill plates at window and similar openings wider than 800 mm in stud walls, provide bearing cripples at jamb studs for sill plate support similar as specified for lintel support preceding.
- .14 Provide 38 x 150 solid wood blocking in walls to receive washroom accessories, handrails, upper casework, etc. as shown on drawings

**3.3 ROOF FRAMING**

- .1 Set roof framing with crown up, minimum 3" birds mouth cut at wall solid support at intermediate beams, vertical cut at ridge to fit ridge board.
- .2 Cut all eaves plumb vertical and true to line.

- .3 Spike all rafters to wall plates, dwarf walls, trusses, ridges, valleys. Install and secure all blocking, bridging, framing. Provide continuous solid blocking for fascia and soffit.
- .4 Provide a minimum of 2 - 38 x 235 mm timber framing members on each side of roof openings, unless noted otherwise. Extend these framing members on two parallel sides of the opening to bear on the nearest adjacent bearing truss or beam.

### **3.4 FURRING, BLOCKING, ROOF FASCIAS, NAILERS, CURBS**

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.
- .2 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Install wood fascia backing, nailers, curbs, roof spacers and other wood supports for roofing and sheet metal work, insulation, blocking, as indicated.
- .5 Secure with galvanized nails. Locate fastenings within 300 mm from ends and uniformly spaced between. Space nails at 200 mm centers except where indicated otherwise.

### **3.5 ROUGH BUCKS, NAILERS**

- .1 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .2 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using steel fasteners.
- .3 Install sleepers as indicated.
- .4 Except where indicated otherwise use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.
- .5 Countersink bolts where necessary to provide clearance for other work.

### **3.6 ERECTION**

- .1 Countersink bolts where necessary to provide clearance for other work.
- .2 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.
- .3 Install damp proofing membrane between sole plate of stud walls set on slabs on grade and foundations, 300 mm wide, continuous with 200 mm laps, turned up

inside, down on outside of wall, stamped in place both sides to studs, lapped over a vapour barrier where such is applied.

- .4 Obtain permission from Building Inspector of local authority having jurisdiction, before covering fire stop bridging with other materials.
- .5 Limit all other vertically continuous stud spaces exceeding 3 m in height by installing horizontal fire stop bridging of same size as studs at strategic points between studs.
- .6 Install horizontal fire stop bridge of same material as studs, between all studs at springing points of ceiling, where studs wall spaces extend continuously beyond edge of ceiling, and as detailed.
- .7 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

### **3.7 ROOF SHEATHING**

- .1 Install roof sheathing in accordance with requirements of NBC.
- .2 Install roof plywood sheathing across wood trusses, rafters and joists.
- .3 Nail securely to joists, rafters, trusses, blocking. Use approved H clips at horizontal joints where no solid blocking under.
- .4 Stagger vertical joints of sheathing.
- .5 Leave smooth and securely fastened ready to receive shingles on sloped roof.

### **3.8 WALL SHEATHING**

- .1 Install wall sheathing in accordance with manufacturer's printed instructions.
- .2 Apply plywood sheathing to walls. Nail securely to studs, plates, blocking and framing.
- .3 Cut sheathing neatly at door, window framed openings.
- .4 Leave smooth and securely fastened ready to receive sheathing paper and finishes.

### **3.9 SURFACE-APPLIED WOOD PRESERVATIVE**

- .1 Treat surfaces of material with wood preservative, before installation. Wherever possible, apply preservative after materials have been cut and fit to size.
- .2 Apply preservative by dipping, or by brush or spray to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.



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- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat all material as follows:
  - .1 Wood in contact with exterior concrete walls.
  - .2 All exposed exterior wood framing.
  - .3 Wood in contact with grade (ie support for crawl space smoke separations).

**END OF SECTION**

**Part 1        General**

**1.1        REFERENCES**

- .1 CSA International, Contractor to reference latest in force standard.
  - .1 CAN/CSA O80 Series-08 , Wood Preservation.
  - .2 CSA O86 Consolidation-14, Engineering Design in Wood.
  - .3 CSA O141-05, Softwood Lumber.
  - .4 CSA S307-M1980, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
  - .5 CSA S347, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
  - .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
  - .7 CAN/CSA-Z809-08 , Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC), Contractor to reference latest in force standard.
  - .1 FSC-STD-01-001, FSC Principle and Criteria for Forest Stewardship.
- .3 National Lumber Grades Authority (NLGA), Contractor to reference latest in force standard.
  - .1 Standard Grading Rules for Canadian Lumber.
- .4 National Research Council (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC), Contractor to reference latest in force standard.
  - .1 CCMC-on-line edition, Registry of Product Evaluations.
- .5 Truss Plate Institute of Canada (TPIC), Contractor to reference latest in force standard.
  - .1 TPIC - 2007, Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses (Limit States Design).

**1.2        ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 45 00.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood trusses 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 Alberta, Canada.
  - .2 Include on drawings:
    - .1 Each shop drawing submission showing connection details.

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- .2 Indicate special structural application and specification as according to local authorities having jurisdiction.
- .3 Indicate TPIC Truss Design Procedure and CSA O86 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates
- .4 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
- .5 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.
- .6 Provide certification that trusses meet requirements of CSA S307 and CSA S347.
- .7 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
- .8 Show location of lateral bracing for compression members.
- .9 Test reports: submit certified test reports for prefabricated wood trusses from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .10 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .11 Instructions: submit manufacturer's installation instructions.

**1.3 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Fabricator for trusses to show evidence of quality control program such as provided by regional wood truss associations, or equivalent.
  - .2 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood trusses from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

- .4 Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

## **Part 2 Products**

### **2.1 DESIGN REQUIREMENTS**

- .1 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for wood truss chords and webs in accordance with engineering properties in CSA O86.
- .2 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for truss joint designs to test engineering properties in accordance with CSA S347 and listed in CCMC Registry of Product Evaluations.
- .3 Design trusses, bracing in accordance with CSA O86.1 for building locality as ascertained by NBC, Climatic Information for Building Design in Canada.
- .4 Limit live load deflection to 1/360th of span where gypsum board ceilings are hung directly from trusses.
- .5 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

### **2.2 MATERIALS**

- .1 Lumber: SPF species, #1/2 grade, softwood, with maximum moisture content of 19% at time of fabrication and to following standards:
  - .1 CSA O141.
  - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
  - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Fastenings: to CSA O86.

### **2.3 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.

### **2.4 SOURCE QUALITY CONTROL**

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.
- .2 Certify by agency accredited by Standards Council of Canada that fire retardant treated wood in accordance with CAN/CSA O80 Series.

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**Part 3 Execution****3.1 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 and after receipt of written approval to proceed from Departmental Representative.

**3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

**3.3 ERECTION**

- .1 Erect wood trusses in accordance with reviewed shop drawings.
- .2 Handling, installation, erection, bracing and lifting in accordance with manufacturers instructions.
- .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 Departmental Representative.
- .8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

**3.4 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, protection, and cleaning 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 product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.

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- .3 Schedule site visits to review work at stages listed:
  - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
  - .2 Twice during progress of work at 25% and 60% complete.
- .2 Upon completion of work, after cleaning is carried out.
- .3 Obtain reports within three days of review and submit immediately to Departmental Representative.

**3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

**END OF SECTION**

**Part 1        General**

**1.1        REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
  - .2 ANSI/HPVA HP-1-2009, Hardwood and Decorative Plywood.
  - .3 ANSI/BHMA A156.16, Auxiliary Hardware.
  - .4 ANSI/ASME 18.6.1-1981 (R2012), Wood Screws (Inch Series).
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1 North American Architectural Woodwork Standards, Edition 3.1, 2017.
- .3 ASTM International
  - .1 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 CSA Group (CSA)
  - .1 CSA O141-05, Softwood Lumber.
- .5 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress, 2019.

**1.2        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, data sheets and catalogue pages for specified products. Include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
  - .2 Submit two copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Prepare and submit shop drawings in general accordance with AWMAC AWS manual.
  - .2 Indicate profiles and dimensions, assembly techniques, jointing, methods of fastening, terminations and other related details.
  - .3 Indicate materials, thicknesses, finishes and hardware.
  - .4 Include schedule or key plan.

- .5 Show profiles, elevations and details at scales recommended by AWMAC AWS.
- .6 Where necessary, show location and type of blocking and backing required within supporting assemblies.
- .4 Samples:
  - .1 Submit duplicate 300 mm long representative samples of each typical item of finish carpentry.
    - .1 Standing and running trim: 300 mm long.
  - .2 Submit duplicate samples of each hardware item to be left exposed in final construction. Samples will be returned for incorporation into the work.

### **1.3 QUALITY ASSURANCE**

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Shop prepare one typical example of each specified item of standing and running trim, stair, complete with shop applied finishes, and install where directed by Departmental Representative.
  - .3 Allow for inspection of mock-up by before proceeding with Work.
  - .4 Accepted mock-up will demonstrate minimum standard for Work.
  - .5 Do not proceed with work prior to acceptance of mock-up by Departmental Representative.
  - .6 Accepted mock-up may remain as part of finished work.

### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with AWS recommendations and as follows.
- .2 Deliver finish carpentry materials only when area of work is enclosed, plaster and concrete work is dry, area is broom clean and site environmental conditions are acceptable for installation.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Maintain indoor temperature and humidity within range recommended by AWS for location of the Work.
  - .3 Store products on site as specified for minimum 72 hours prior to installation.
  - .4 Store and protect finish carpentry products from moisture, nicks, scratches, and blemishes.
  - .5 Replace defective or damaged materials with new.



- .4 Waste Management: for packaging and materials, in accordance with Section 01 74 19 - Waste Management and Disposal.

## **Part 2 Products**

### **2.1 QUALITY GRADE**

- .1 Provide materials and perform work of this Section in accordance with AWMAC NAAWS Custom Grade.
- .2 In case of conflict between Contract Documents and AWMAC NAAWS grade requirements, Contract Documents govern.

### **2.2 MATERIALS**

- .1 Softwood and hardwood lumber: Sound lumber to specified NAAWS grade requirements, kiln-dried to moisture content recommended for location of the Work.
  - .1 Machine stress-rated lumber is acceptable for all purposes.
- .2 Hardwood lumber: To AWMAC NAAWS Rules.
- .3 MDF (medium density fibreboard) core: to ANSI A208.2, density 769 kg/m<sup>3</sup>, 19 mm thick unless indicated otherwise.

### **2.3 TRIM**

- .1 Acceptable materials:
  - .1 Paint grade stock for opaque finish: S-P-F species.
  - .2 MDF.
- .2 Profile: Square with beveled edges.
- .3 Provide:
  - .1 Standing and running trim.
  - .2 Door and window casings.
  - .3 Window aprons.
  - .4 Window stools.

### **2.4 DOOR AND WINDOW FRAMES**

- .1 Frames: Solid wood, S-P-F species.

### **2.5 HANDRAILS AND POSTS**

- .1 Material: Oak lumber.
- .2 Handrail brackets: Stainless steel, 50 to 75 mm projection.

### **2.6 SHELF FOR ENTRY CLOSET**

- .1 Core: MDF.

- .2 Surfaces: HPDL.
- .3 Front edge: 3 mm PVC, colour coordinated to HPDL.
- .4 Closet hanger bar and supports: Metal flanged sockets with metal poles, diameter approximately 25 mm, chrome finish; three screws per mounting flange. Provide center supports for closet rods longer than 1500 mm.

## **2.7 FASTENINGS**

- .1 Provide screws, bolts, expansion shields and other fastening devices required for satisfactory installation.
- .2 Exposed fasteners to match finish of hardware.
- .3 Nails and staples: to ASTM F1677, galvanized to ASTM A153/A153M for exterior work, interior humid areas; plain finish elsewhere.
- .4 Wood screws: to ANSI/ASME 18.6.1, countersunk flush type unless indicated otherwise, in sizes to suit application, galvanized to ASTM A153/A153M for exterior work, interior humid areas, electroplated steel for other locations.
- .5 Splines: Metal.

## **2.8 HARDWARE**

- .1 Use one manufacturer's product for all similar items.
- .2 Miscellaneous Hardware: to ANSI/BHMA A156.16:
  - .1 Clothes/robe hook: Surface mounted, Type 304 stainless steel with satin finish, flange and cap style with concealed mounting plate.
    - .1 Acceptable products:
      - .1 ASI 10-7340-S.
      - .2 Bobrick B-76717.
      - .3 Frost 1138-S.
- .3 Hardware fastenings:
  - .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation of hardware.
  - .2 Exposed fastening devices to match finish of hardware.
  - .3 Use fasteners compatible with material through which they pass.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verify conditions of substrates are acceptable for wood products installation in accordance with NAAWS tolerances and requirements of Contract Documents.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions.

- .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Install items of finish carpentry in accordance with AWMAC NAAWS grade specified for respective items.
- .2 In case of conflict between Contract Documents and NAAWS grade requirements, Contract Documents govern.
- .3 Install items of finish carpentry at locations shown on drawings.
  - .1 Position accurately, level, plumb straight.
  - .2 Fasten and anchor securely.
- .4 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.
- .5 Form joints to conceal shrinkage.

### **3.3 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 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 mitered 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 degree scarf type joint.
  - .4 Install door and window trim in single lengths without splicing.
- .3 Interior and exterior frames:
  - .1 Set frames with plumb sides and level heads and sills, and secure.
- .4 Handrails, wall rails and bumper rails.
  - .1 Install handrails in locations indicated.
  - .2 Make joints hair line, dowelled and glued.

- .3 Install support brackets.
- .4 Install brackets at ends and at 900 mm on center maximum at intermediate spacings.
- .5 Shelving:
  - .1 Install shelving on ledgers.

### **3.4 TOUCH-UP AND PROTECTION**

- .1 Fill and retouch all nicks, chips and scratches in factory finishes and substrate materials to NAAWS standards. Replace damaged items that cannot be repaired to NAAWS standards.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by finish carpentry installation.

**END OF SECTION**

**Part 1        General**

**1.1        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-1-2009, Standard for Hardwood and Decorative Plywood.
- .2 ASTM International Sinks
  - .1 ASTM D638-10, Tensile Properties of Plastics.
  - .2 ASTM D790-10, Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - .3 ASTM D2583-13a, Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Standards, 2<sup>nd</sup> Edition, 2014.
- .4 Builders Hardware Manufacturers Association (BHMA)
  - .1 ANSI/BHMA A156.9-2015, Cabinet Hardware.
- .5 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 71.20-M88, Adhesive, Contact, Brushable.
- .6 Canadian Standards Association (CSA)
  - .1 CSA B111-74 (R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O112.10-08 (R2013), Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
  - .3 CSA O121-08 (R2013), Douglas Fir Plywood.
  - .4 CSA O141-05 (R2014), Softwood Lumber.
  - .5 CSA O151-09 (R2014), Canadian Softwood Plywood.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .8 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD3-2005, High-Pressure Decorative Laminates (HPDL).
- .9 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber, 2014.

## **1.2 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 WHMIS MSDS for products used in the project.
- .3 Shop Drawings:
  - .1 If required, submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta.
  - .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 duplicate samples of hardwood, sized 200 x 200 mm, or 300 mm long.
  - .2 Submit duplicate manufacturer's samples of high-pressure decorative laminate for pattern and colour selection.
  - .3 Submit duplicate manufacturer's samples of solid surface countertop for pattern and colour selection.
- .5 Certifications: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

## **1.3 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB, and wood based composite panels to CSA and NPA standards.

## **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 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, indoors, in dry location 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.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Softwood lumber: Unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CSA O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 AWMAC Custom grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Canadian softwood plywood (CSP): To CSA O151, standard construction.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .4 Particleboard core: To ANSI A208.1, Grade M2 or better.
  - .1 Thickness swelling: Maximum 5.5%.
  - .2 Modulus of rupture: Minimum 13.0 N/mm<sup>2</sup> (1885 psi).
- .5 MDF (medium density fibreboard) core: To ANSI A208.2, Grade 130 or better.
  - .1 Modulus of rupture: Minimum 21.6 N/mm<sup>2</sup> (3130 psi).
  - .2 MDF resin to contain no added urea-formaldehyde.
- .6 Moisture-resistant MDF: To ANSI A208.2, Grade 155 MR50.
- .7 High pressure decorative laminate (HPDL) for horizontal surfaces: To NEMA LD3, Horizontal Grade Standard (HGS), 1.2 ± 0.12 mm thick.
- .8 HPDL for vertical surfaces: To NEMA LD3, Vertical Grade Standard (VGS), 0.7 mm ± 0.10 mm thick.
- .9 Laminate backing sheet: Grade BKL, minimum 0.5 mm thickness.
- .10 Laminate adhesive: Contact adhesive to CAN/CGSB 71.20.
- .11 Thermofused Melamine: To NEMA LD3, melamine, polyester, or foil resin impregnated paper thermally fused under pressure to an approved core.
  - .1 High wear resistant thermofused melamine: Equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
- .12 Nails and staples: To CSA B111.
- .13 Wood screws: Stainless steel, type and size to suit application.

- .14 Splines: Metal.
- .15 Sealant: In accordance with Section 07 92 00 - Joint Sealants.

## **2.2 HARDWARE**

- .1 General:
  - .1 Hardware: ANSI/BHMA A156.9.
  - .2 Finish: Brushed nickel or stainless steel, unless otherwise specified.
- .2 Hinges: European style hinges, minimum 110° opening.
- .3 Pulls: Metal, contemporary closed end bar pull.
  - .1 Mounting: 128 mm center-to-center screw attachment.
  - .2 Overall dimension: 170 mm long; 40 mm projection from mounting surface.
  - .3 Confirm proposed product with Departmental Representative.
- .4 Catches: Type I – magnetic catch.
- .5 Adjustable shelf pilasters: Vertical slotted shelf standard, steel, recessed mounting. Provide with corresponding matching clips.
- .6 Drawer slides: Full extension, side-mounted drawer slides with ball bearings, zinc coated steel, 30 kg (66 lb) load capacity, soft closing.

## **2.3 MANUFACTURED UNITS**

- .1 All work to AWMAC Custom grade.
- .2 Core: Particleboard or MDF.
- .3 Casework:
  - .1 Construction type: Frameless.
  - .2 Cabinet and door interface: Flush overlay.
  - .3 Faces: HPDL.
  - .4 Exposed interior surfaces: Melamine.
  - .5 Edgeband: 3 mm PVC, colour coordinated to HPDL.
    - .1 Adjustable shelves: Apply edgeband to all four sides.
  - .6 Ladder base: Canadian softwood plywood, 19 mm thick.
    - .1 Kitchenette: Mount 6 mm moisture-resistant MDF to front face of ladder base, finish with HPDL.
  - .7 Toe kick: HPDL.
- .4 Cabinet and drawer boxes:
  - .1 Interior surfaces: Melamine.
- .5 Laminate countertops:
  - .1 Horizontal surfaces: HPDL.
  - .2 Front edges: 3 mm PVC, colour coordinated to HPDL.



## **2.4 FABRICATION**

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut-outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items that are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Veneer laminate 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 3000 mm. Keep joints 600 mm from sink cut-outs.
- .9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20°. Do not mitre laminate edges.
- .10 Apply laminate backing sheet to reverse side of core of laminate work.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verify conditions of substrates are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Perform 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 Supply and install heavy duty fixture attachments for wall mounted cabinets.

- .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 laminate counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.
- .7 Install closet
- .8 Apply bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .9 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

### **3.3 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
  - .1 Clean millwork outside surfaces, and inside cupboards and drawers.
  - .2 Remove excess glue from surfaces.
- .4 Waste Management: Remove waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

### **3.4 PROTECTION**

- .1 Protect millwork from damage until final inspection.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by architectural woodwork installation.

**END OF SECTION**

**Part 1        General**

**1.1            REFERENCES**

- .1    ASTM International
  - .1    ASTM D198-09, Standard Test Methods of Static Tests of Lumber in Structural Sizes.
  - .2    ASTM D1761-12, Standard Test Methods for Mechanical Fasteners in Wood.
  - .3    ASTM D4761-13, Standard Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material.

**1.2            PERFORMANCE REQUIREMENTS**

- .1    Structural performance:
  - .1    Deck: Uniform load: 4.8 kPa (100 lb/ft<sup>2</sup>).
  - .2    Stair treads: Concentrated load 35.9 kPa (750 lbs/ft<sup>2</sup>).

**1.3            SUBMITTALS**

- .1    Section 01 33 00: Submittal Procedures.
- .2    Product Data: Indicate technical data, sizes, profiles, surface style, performance characteristics.
- .3    Shop Drawings: Indicate plan layouts, elevations, large scale details, connections, and attachments to adjacent construction. Identify all component parts, including fastening system and installation hardware.
  - .1    Provide structural analysis information stamped and sealed by a Professional Structural Engineer licensed in Alberta.
- .4    Samples: Submit duplicate manufacturer samples, minimum 150 mm long x full width, illustrating colour, texture, and finish.
- .5    Installation Data: Manufacturer's installation requirements.

**1.4            CLOSEOUT SUBMITTALS**

- .1    Maintenance Data: Include instructions for cleaning recommendations, stain removal, surface and gloss restoration.

**1.5            DELIVERY, STORAGE, AND PROTECTION**

- .1    Section 01 61 00: Transport, handle, store, and protect products.
- .2    Protect components from damage by retaining shipping protection in place until installation.

## **1.6 ENVIRONMENTAL CONDITIONS**

- .1 Install deck materials within manufacturer's recommended temperature and relative humidity ranges.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Composite lumber: Extruded decking composed of wood flour and plastic core, with polyethylene cap.
  - .1 Flexural properties (ASTM D4761 and ASTM D198):
    - .1 Modulus of elasticity:
      - .1 Design value: 1379 MPa (200,000 psi).
      - .2 Ultimate value: 2840 MPa (412,000 psi).
    - .2 Tensile strength:
      - .1 Design value: 10.8 MPa (1560 psi).
      - .2 Ultimate value: 3.45 MPa (500 psi).
  - .2 Screw retention (ASTM D1761): 1375 N·m.
- .2 Fasteners: Decking manufacturer's proprietary system.

### **2.2 FINISHES**

- .1 Colour and pattern: As selected by Departmental Representative from manufacturer's standard range.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verify existing conditions before starting work.
- .2 Verify that substrates are ready to receive work and dimensions are as indicated on shop drawings.

### **3.2 INSTALLATION**

- .1 Install composite decking to manufacturer instructions.
- .2 Cut, drill and rout using carbide-tipped blades.
- .3 Pre-drill holes located less than 25 mm from plank ends.
- .4 Cut ends square.
- .5 Gap boards as recommended by manufacturer.

**3.3 CLEANING**

- .1 Clean in accordance with decking manufacturer's written instructions.

**END OF SECTION**