PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 05 41 00 – Structural Metal Stud Framing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.
- .2 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 ASTM A193/A193M-12b, Standard Specification for Alloy Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
- .4 ASTM A307-12, Standard Specification for Carbon Steel Bots and Studs, 60,000 PSI Tensile Strength.
- .5 ASTM A325-14, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .6 ASTM A325M-14, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric).
- .7 ASTM A490M-14a, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.

.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA).
- .1 CISC/CPMA 1-[73b], Quick-Drying One-Coat Paint for Use on Structural Steel.
- .2 CISC/CPMA 2-[75], Quick-Drying Primer for use on Structural Steel.

.4 Canadian Standards Association (CSA)
- .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA S16-14, Design of Steel Structures.
- .3 CSA S136-12 Package, North American Specification for the Design of Cold Formed Steel Structural Members.
- .4 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel.
- .5 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
- .6 CSA W55.3-08(R2013), Certification of Companies

for Resistance Welding of Steel and Aluminum.
.7 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.5 Master Painters Institute
.1 MPI-INT 5.1-[98], Structural Steel and Metal Fabrications.
.2 MPI-EXT 5.1-[98], Structural Steel and Metal Fabrications.

.6 The Society for Protective Coatings (SSPC)
.1 SSPC SP 6/NACE No. 3-[00], Commercial Blast Cleaning.

1.3 DESIGN REQUIREMENTS

.1 Design details and connections in accordance with requirements of CSA S16 to resist forces, moments, shears and allow for movements indicated.

.2 Shear connections:
.1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
.2 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.

.3 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Ontario, Canada for non standard connections.

1.4 SHOP DRAWINGS

.1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section [01 11 01] [01 33 00].

.2 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
.1 Description of methods.
.2 Sequence of erection.
.3 Type of equipment used in erection.
.4 Temporary bracings.

.3 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Ontario, Canada.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 11 01.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material [in appropriate on-site] for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

.5 Divert unused paint material from landfill to official hazardous material collections site approved by Departmental Representative.

.6 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Structural steel: to CSA G40.20/G40.21 Grade as indicated and/or CSA S136, minimum 30% recycled content.

.2 Anchor bolts: to CSA G40.20/G40.21, Grade 300W, minimum 30% recycled content.

.3 High strength anchor bolts: to ASTM A193/A93M, minimum 30% recycled content.

.4 Bolts, nuts and washers: to ASTM A307 or as noted on structural drawings, minimum 30% recycled content.

.5 Welding materials: to CSA W48 Series and certified by Canadian Welding Bureau.

.6 Shop paint primer: to CISC/CPMA 1, Ecologo certified.

.7 Hot dip galvanizing: galvanize steel, where indicated, to ASTM A123/A123M, minimum zinc coating of 600 g/mý, Coating Grade 85.

.8 Shear studs: to CSA W59, Appendix H.

2.2 FABRICATION

.1 Fabricate structural steel in accordance with CSA S16 and in accordance with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

.3 Continuously seal members by continuous welds where indicated. Grind smooth.

.4 Provide holes in flanges for attachment of wood nailers as specified.

2.3 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel in accordance with CSA S16.

.2 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.

.3 Apply one coat of primer in shop to steel surfaces.

.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.

.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.

.6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

PART 3 - EXECUTION

3.1 GENERAL

.1 Structural steel work: in accordance with CSA S16.

.2 Welding: in accordance with CSA W59.

.3 Companies to be certified under Division 01 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.3 MARKING

.1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.

.2 Match marking: shop mark for fit and match.

3.4 ERECTION

.1 Erect structural steel, as indicated and in accordance with CSA S16 and in accordance with reviewed erection drawings.

.2 Field cutting or altering structural members: to approval of Departmental Representative.

.3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.

.4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.5 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.

.2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.

.3 Submit test reports to Departmental Representative within 2 weeks of completion of inspection.

.4 Departmental Representative will pay costs of tests as specified in Section 01 29 83.

.5 Test shear studs in accordance with CSA W59.

3.6 FIELD PAINTING

.1 Paint in accordance with Section 09 91 99.

.1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP-6 except as specified otherwise. Apply in accordance with CAN/CGSB-85.10.

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
.1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
.2 ASTM A123/A123M-13, Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
.3 ASTM A269/A269M-14e1, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
.4 ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.2 CSA International
.1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CSA S16-14, Design of Steel Structures.
.3 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
.4 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.3 Green Seal Environmental Standards (GS)
.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.4 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - current edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS MSDS.
.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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] [indoors] [in dry location] and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/ G40.21, Grade 300W, minimum 30% recycled content.

.2 Steel pipe: to ASTM A53/A53M standard weight, minimum 30% recycled content.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Galvanizing: hot dip, unpassivated, to ASTM A123/A123M, Coating Grade 85, minimum 600 g/mý.

.7 Zinc rich primer for galvanized surfaces: zinc rich, readymix to CAN/CGSB-1.181, Ecologo certified.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly

secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/mý, Coating Grade 85, to ASTM A123/A123M.

.2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.

.3 Shop coat primer: 5.1A MPI- INT, EXT 5.1B in accordance with chemical component limits and restrictions requirements and VOC limits of CCD-047a, CCD-048.

.4 Zinc primer: zinc rich, ready mix to MPI- INT, EXT 5.2C, in accordance with chemical component limits and restrictions requirements and VOC limits of CCD-047a, CCD-048.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:
.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
.2 Concrete, mortar and masonry.
.3 Wood.

2.5 SHOP PAINTING

.1 Primer: VOC limit 250 g/L maximum to CCD-047a, CCD-048.

.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.4 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS

.1 Steel angles: prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

.3 Finish: shop painted.
.1 Primer: VOC limit 250 g/L maximum to GS-11 when applied onsite.

2.7 PIPE RAILINGS

.1 Steel pipe: See drawings for shapes and sizes.

.2 Galvanize exterior pipe railings after fabrication.

2.8 CHANNEL FRAMES

.1 Fabricate frames from steel, sizes of channel and opening as indicated.

.2 Weld channels together to form continuous frame for jambs and head of openings, sizes as indicated.

.3 Weld steel strap anchors to channel jamb frame as noted on th structural drawings, where required.

.4 Finish: prime coat painted.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications 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 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CSA S16 or Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
.1 Primer: maximum VOC limit 250 g/L to GS-11.

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
.1 Primer: maximum VOC limit 250 g/L to GS-11.

3.3 PIPE RAILINGS

.1 Install pipe railings as shown on drawings.

.2 Anchor standards as shown on drawings. If welded ensure all welds are ground smooth.

3.7 CHANNEL FRAMES

.1 Install steel channel frames to openings as indicated.

3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

.3 Waste Management: separate waste materials for reuse.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canada Green Building Council (CaGBC)
- .1 LEED Canada For New Construction and Major Renovations 2009.
- .2 LEED Canada For Core and Shell 2009.

.3 Canadian Standards Association (CSA International)
- .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
- .2 CSA O80 Series-15, Wood Preservation.
- .3 CSA O121-08(R2013), Douglas Fir Plywood.
- .5 CSA O141-05(R2014), Softwood Lumber.
- .6 CSA O151-09(R2014), Canadian Softwood Plywood.
- .7 CSA O153-[13], Poplar Plywood.
- .8 CAN/CSA-O325.0-[92R2003), Construction Sheathing.
- .9 CSA Z809-16, Sustainable Forest Management.

.4 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1.
- .3 FSC Accredited Certified Bodies.

.5 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber December 2014.

1.2 SUBMITTALS

.1 Submit Submittal submissions: in accordance with Section 01 11 01.

.2 Sustainable Submittals:
- .1 Co-ordinate submittal requirements and provide submittals required by Section 01 47 15.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

.4 Wood materials to be certified by Forest Stewardship Council.

.5 Provide CSA Z809, SFI or Forestry Stewardship Council (FSC) Chain of Custody certificates for wood materials.

.6 Sustainable Requirements:
.1 Construction requirements: in accordance with Section 01 47 15.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Section 01 47 15.

2.2 LUMBER MATERIAL

.1 Lumber: unless specified otherwise, softwood, S4S, S-DRY Lumber graded and stamped in accordance with following standards:
.1 CSA-O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.

.3 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers: to NLGA 113d. and 121c., S4S.
.1 Board sizes: "Standard" or better grade.
.3 Dimension sizes: "Standard" light framing or better grade.
.4 Post and timbers sizes: "Standard" or better grade.

2.3 PANEL MATERIALS

.1 Plywood panel manufacturing and details for plywood specified to CSA O121 and CSA O151 is the Plywood Handbook, published by the Canadian Plywood Association (CanPly).

.2 Douglas fir plywood: to CSA O121, types as noted on drawings.
.1 Urea-formaldehyde free.

.3 Canadian softwood plywood (CSP): to CSA O151, Class II, [eastern white spruce].

.1 Urea-formaldehyde free.
.2 Forest Stewardship Council (FSC) certified.

.4 Poplar Plywood: to CSA O153, standard construction.
.1 Urea-formaldehyde free.

.5 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.
.1 Urea-formaldehyde free.

2.4 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111.

.2 Bolts: diameters, sizes and lengths as noted on the drawings, complete with nuts and washers.

.3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.5 FINISHES

.1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work, interior highly humid areas, and pressure-preservative lumber].

.2 Stainless steel: use stainless steel where shown on drawings.

2.6 WOOD PRESERVATIVE

.1 Surface-applied wood preservative: clear or coloured to match manufactured colours], copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

.2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.

.3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.

PART 3 - EXECUTION

3.1 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.

3.2 INSTALLATION

.1 Comply with requirements of NBC 2015, Division B, supplemented by the following paragraphs.

.2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

.3 Align and plumb faces of furring and blocking to tolerance of [1:600].

.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

.6 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

3.3 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

3.4 SCHEDULES

.1 See drawings for extent of work.

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
- .1 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canada Green Building Council (CaGBC)

.3 CSA International
- .1 CSA B111-[74(R2003)], Wire Nails, Spikes and Staples.
- .2 CSA O80 Series-15, Wood Preservation.
- .3 CSA O86-14, Engineering Design in Wood.
- .4 CSA Z809-16, Sustainable Forest Management.

.4 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
- .2 FSC-STD-20-002-[2004], Structure and Content of Forest Stewardship Standards V2-1.
- .3 FSC Accredited Certified Bodies.

.5 Green Seal Environmental Standards (GS)
- .1 GS-36-[00], Commercial Adhesives.

.6 National Lumber Grades Authority (NLGA)
- .1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for [wood decking] and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS.

.3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.4 Samples:
- .1 Submit for review and acceptance of each unit.
- .2 Samples will be returned for inclusion into work.
- .3 Submit [2] [300 x 300] mm samples of [each type].

.5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

.6 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that the % of construction wastes that were recycled or salvaged.
.7 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.8 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
.9 Low-Emitting Materials:
.1 Submit listing of adhesives, sealants, paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.
.2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminate adhesives used in building, stating that they contain no urea-formaldehyde.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 decking from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Wood decking: to NLGA standard Grading Rules for Canadian Lumber select grade Western Red Cedar in width and thickness specified on the drawings. Kiln dry decking to 15% maximum moisture content. CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.

.2 Decking lengths: 1.8 to 6 m or longer with a minimum of 90% planks exceeding 3 m. Square end trimmed.

.3 Nails: to CSA B111, hot dipped galvanized or stainless steel, sizes to CSA O86.

.4 Screws: treated steel or stainless steel recommended by manufacturer for specific use planned.

.5 Wood preservative: odourless type to CSA O80 for natural finish.

.6 Adhesive and Sealants: in accordance with Section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood decking 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 INSTALLATION

.1 Do wood deck work to CSA O86 except where specified otherwise.

.2 Install decking to CSA O86, controlled random pattern.

.3 Supply minimum of [1] bearing support for each plank except extend cantilevers over two supports. Install sloping deck with tongues up.

.4 Stagger end joints in adjacent planks minimum of 0.5

m.
.1 Separate joints in same area by at least 2 intervening courses.
.2 Avoid joints in first fifth of end spans.
.3 Minimize joints in middle third of span.

.5 Apply preservative to end cuts of pressure treated lumber.

3.3 FIELD QUALITY CONTROL

.1 Testing:
.1 Testing moisture content of delivered material will be performed by testing laboratory designated by Departmental Representative.
.2 Departmental Representative will pay for costs of testing in accordance with Section 01 29 83.
.3 Testing moisture content of delivered material will be by moisture meter with adjustments for species and temperature.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by wood decking installation.

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 Fibreboard (MDF) for Interior Applications.
.3 ANSI/HPVA HP-1-[2009], American National Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC), Architectural Woodwork Institute (AWI) amd Woodwork Institute (WI).
.1 AWI/AWMAC/WI Architectural Woodwork Standards, Edition 2-2014.

.3 Canada Green Building Council (CaGBC)

.4 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-11.3-[M87], Hardboard.

.5 CSA International
.1 CSA B111-[74(R2003)], Wire Nails, Spikes and Staples.
.2 CSA O121-08(R2013), Douglas Fir Plywood.
.3 CSA O141-05(R2014), Softwood Lumber.
.4 CSA O151-09(R2014), Canadian Softwood Plywood.
.5 CSA O153-13, Poplar Plywood.
.6 CSA Z809-16, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC)
.1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
.2 FSC-STD-20-002-[2004], Structure and Content of Forest Stewardship Standards V2-1.
.3 FSC Accredited Certified Bodies.

.7 National Lumber Grades Authority (NLGA)
.1 NLGA Standard Grading Rules for Canadian Lumber 2014.

.8 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, OSB, MDF, cement board and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS MSDS.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.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 Samples will be returned for inclusion into work.
.3 Submit duplicate [300 x 300 mm] samples of all materials.

.5 Certifications: submit AWMAC GIS certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.1 Architectural woodwork shall be manufactured and/or installed to the current AWMAC Architectural Woodwork Standards.
.2 Shop drawings shall be submitted to the AWMAC Chapter office for review before work commences.
.3 Work that does not meet the AWMAC Architectural Woodwork Standards, as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the. Departmental Representative.
.5 If the woodwork contractor is an AWMAC Manufacturer member in good standing, a two (2) year AWMAC Guarantee Certificate will be issued.
.6 The AWMAC Guarantee shall cover replacing, reworking and/or refinishing any deficient architectural woodwork due to faulty workmanship or defective materials supplied by the woodwork contractor, which may appear during a two (2) year period following the date of issuance.
.7 If the woodwork contractor is not an AWMAC Manufacturer member they shall provide the Departmental Representative with a two (2) year maintenance bond, in lieu of the AWMAC Guarantee Certificate, to the full value of the architectural woodwork contract.

.6 Test and Evaluation Reports: submit certified test reports for composite wood from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.7 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating the % of construction wastes were recycled or salvaged.

.3 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.4 Regional Materials: submit evidence that project incorporates required percentage [10] [20]% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 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.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 11 01.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Softwood lumber: S4S, S-DRY graded and stamped in accordance with following standards:
- .1 CSA O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 AWI/AWMAC/WI Architectural Woodwork Standards [custom] [premium] grade, moisture content as specified.
- .4 Machine stress-rated lumber is acceptable.
- .5 Hardwood lumber: moisture content 15 % or less in accordance:
  - .1 National Hardwood Lumber Association (NHLA).
  - .2 AWI/AWMAC/WI Architectural Woodwork Standards [custom] [premium] grade, moisture content as specified.
- .6 CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.

.2 Panel Material: Urea-formaldehyde free

.3 CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.

.4 Douglas fir plywood (DFP): to [CSA O121], standard construction.

.5 Canadian softwood plywood (CSP): to [CSA O151], standard construction.

.6 Hardwood plywood: to [ANSI/HPVA HP-1].

.7 Poplar plywood (PP): to [CSA O153], standard construction.

.8 Particleboard: to [ANSI A208.1].

.9 Hardboard: to [CAN/CGSB-11.3].

.10 Medium density fibreboard (MDF): to [ANSI A208.2], density 640-800 kg/mü.

.11 Fiber-Cement siding panels to be 11mm HardieReveal2.0, with colour plus as supplied and manufactured by James Hardie Canada including all fasteners ad accessories. Approved alternates will be considred.
- .1 Panels for walls and soffits are to be 11mm x nominal 1220mm x 2440mm smooth faced fiber-cement panels, urea-formaldehyde free. Panels to meet ASTM E136 requirements for non-combustibility. Panels to meet ASTM C1186 Grade II, Type A requirements for fiber-cement flat sheets.
- .2 Fasteners are to be countersunk. Fasteners to be countersunk 1-1.5mm below surface of the panels. Fasteners to be as recommended and supplied by the manufacturer. Typical fasteners are #8 x 40mm buglehead.
- 3. System to be supplied with all necessary matching trim and accessories to provide a complete, finished system as approved by the manufacturer.

4. System to meet Warnock Hersey and Intertek requirements ASTM E136 for non-combustibility, ASTM E119 for fire resistance, and ASTM E84 for surface burning characteristics. Flame spread 0 or less, smoke developed index 5 or less.

2.2 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to ASTM A123/A123M for exterior work, interior humid areas and for treated lumber; stainless steel finish elsewhere.

.2 Wood screws: stainless steel, type and size to suit application.

.3 Splines: wood.

.4 Adhesive and Sealants: in accordance with Section 07 92 00.

PART 3 - EXECUTION

3.1 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.

3.2 INSTALLATION

.1 Do finish carpentry to AWI/AWMAC/WI Architectural Woodwork Standards.

.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.

3.3 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 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.

.3 Interior and exterior frames:
.1 Set frames with plumb sides and level heads and sills and secure.

.4 Panelling:
.1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
.2 Secure panelling and perimeter trim using concealed or countersunk fasteners as recommended and supplied by panel manufacturer and spaced as per the manufacturers recommendations for wind load.
.3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

.5 Shelving:
.1 Install shelving as indicated on drawings.

.6 Hardware:
.1 Install accessible lever type door handles as indicated on drawings.

3.4 INSTALLATION OF TRIM

.1 See drawings for locations sizes and types to be installed.

3.5 INSTALLATION OF SHELVING

.1 Softwood and popular plywood select grade, size and thickness as shown on the drawings.

.2 Edge banding: provide 10mm thick solid matching wood strip on edges, exposed in final assembly.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by finish carpentry installation.

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)
.1 ANSI 208.1-[09], Particleboard.
.2 ANSI/NEMA LD3-[05], High Pressure Decorative Laminates.

.2 ASTM International
.1 ASTM D2832-[92(2005)], Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
.2 ASTM D2369-10e1, Standard Test Method for Volatile Content of Coatings.

.3 Canada Green Building Council (CaGBC)

.4 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.5 CSA International
.1 CSA O112-SERIES [M1977(R2006)], Standards for Wood Adhesives.
.2 CSA O121-08(R2013), Douglas Fir Plywood.
.3 CSA O151-09(R2014), Canadian Softwood Plywood.
.4 CSA O153-13, Poplar Plywood.

.6 Environmental Choice Program (ECP)
.1 CCD-045-[95], Sealants and Caulking Compounds.
.2 CCD-046-[95], Adhesives.

.7 Forest Stewardship Council (FSC)
.1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
.2 FSC-STD-20-002-[2004], Structure and Content of Forest Stewardship Standards V2-1.

.8 Green Seal Environmental Standards (GS)
.1 GS-36-[00], Commercial Adhesives.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for [laminate, adhesive, and core materials] and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS MSDS. Indicate VOC's for adhesives in g/L.

.3 Samples:
.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.
.3 Submit duplicate samples of joints, edging, cutouts and postformed profiles.

.4 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating the % of construction wastes that were recycled or salvaged.
.3 Regional Materials: submit evidence as to what % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials were used for project.

.6 Certified Wood:
.1 Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with [FSC-STD-01-001].

.7 Low-Emitting Materials:
.1 Submit listing of [composite wood products used in building, stating they contain no added urea-formaldehyde resins, and laminate adhesives used in building, stating they contain no urea-formaldehyde.
.2 Submit listing of adhesives and sealants and sealers used in building, showing compliance with VOC and chemical component limits or restrictions requirements.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for laminate work for incorporation into manual specified in Section 01 78 00.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 laminate, adhesive, and core materials from [nicks, scratches, and blemishes].
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Laminated plastic for postforming & flatwork: to ANSI/NEMA LD3.
.1 Type: General purpose.
.2 Grade: HGS.
.3 Size: 0.76 mm thick.
.4 Colour: integral colour throughout.
.5 Pattern: as noted on the drawings.
.6 Finish: matt, textured.

.2 Plywood core: to CSA O121, thickness as shown on the drawings.
.1 FSC certified.
.2 Ensure plywood core is urea-formaldehyde free.

.3 Particleboard core: to ANSI 208.1, thickness as shown on the drawings.
.1 FSC certified.
.2 Ensure particleboard core is urea-formaldehyde free.

.4 Laminated plastic adhesive: contact adhesive to CAN/CGSB-71.20.
.1 Test for acceptable VOC emissions in accordance with ASTM D2369 and ASTM D2832.

2.2 FABRICATION

.1 Comply with ANSI/NEMA LD3, Annex A.

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 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.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.7 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.8 Apply laminated plastic liner sheet to interior of cabinetry where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for laminate, adhesive, and core materials 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.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 INSTALLATION

.1 Install work plumb, true and square, neatly scribed to adjoining surfaces.

.2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.

.3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.

.4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.

.5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.
.1 Clean to ANSI/NEMA LD3, Annex B.
.2 Remove traces of primer, caulking, epoxy and filler materials and clean doors and frames.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

.1 Cover finished laminate veneered surfaces with heavy kraft paper or put in cartons during shipment.

.2 Protect installed laminated surfaces in accordance with manufacturer's written recommendations.
.1 Remove protection only immediately before final inspection.

.3 Protect installed products and components from damage during construction.

.4 Repair damage to adjacent materials caused by laminate, adhesive, and core materials installation.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 05 41 00.

1.2 REFERENCES

.1 Canada Green Building Council (CaGBC)

.2 Canadian Urethane Foam Contractors Association Inc. (CUFCA)

.3 Green Seal (GS)
.1 GS-11-2013, Standard for Paints and Coatings.

.4 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S101-[07], Standard Methods of Fire Tests of Building Construction and Materials.
.2 CAN/ULC-S102-[10], Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.3 CAN/ULC-S705.1-[01], Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification. Includes Amendment 1.2.
.4 CAN/ULC-S705.2-[05], Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for polyurethane foam sprayed insulation and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Test Reports:
.1 Submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

.4 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

.5 Manufacturer's Reports:

.1 Manufacturer's Field Reports: submit to manufacturer's written reports within [3] days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

.6 .1 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating the % of construction wastes that were recycled or salvaged.
.2 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.3 Regional Materials: submit evidence that project incorporates what % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.4 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

.2 Qualifications:
.1 Installer: person specializing in sprayed insulation installations with documented experience approved by manufacturer.
.2 Manufacturer: company with experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.

.3 Health and Safety Requirements: worker protection:
.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:
.2 Workers must wear gloves, respirators, dust masks, long sleeved clothing, eye protection and protective clothing when applying foam insulation.
.3 Workers must not eat, drink or smoke while applying foam insulation.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21.

.5 Packaging Waste Management: remove for reuse and return pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

1.6 SITE CONDITIONS

.1 Ventilate area in accordance with Section 01 51 00.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Insulation: spray polyurethane to CAN/ULC-S705.1.

.2 Primers: in accordance with manufacturer's recommendations for surface conditions.
.1 Maximum VOC limit 100 g/L to GS-11 Standard

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and [manufacturer's printed instructions.

.2 Use primer where recommended by manufacturer.

.3 Apply sprayed foam insulation in thickness as shown on the drawings.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:
.1 Provide manufacturer's field services consisting of product use recommendations and methods of installation.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.
.1 Remove insulation material spilled during installation and leave work area ready for application of wall board.

.3 Waste Management: separate waste materials for recycling.

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Construction Documents Committee
.1 CCDC 2-2008, Stipulated Price Contract.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-19.13M-[M87], Sealing Compound, One Component, Elastomeric Chemical Curing.
.2 CAN/CGSB-19.24M-[M90], Multi-Component, Chemical Curing Sealing Compound.
.3 CGSB 19-GP-14M-[84], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.5 AMBIENT CONDITIONS

.1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00.

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.6 SEQUENCING

.1 Sequence work in accordance with Section [01 32 16.07].

.2 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.7 WARRANTY

.1 For sealant and sheet materials the 12 months warranty period prescribed in subsection GC3.13 of General Conditions is extended to 24 months.

.2 Warranty: include coverage of installed sealant and sheet materials which:
.1 Fail to achieve air tight and watertight seal.
.2 Exhibit loss of adhesion or cohesion.
.3 Do not cure.

PART 2 - PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Section [01 47 15].

2.2 SHEET, SEALANT, ADHESIVES

.1 Tyvek or approved equal with sealants and adhesives approved by manufacturer.

.2 Primer: recommended by sealant manufacturer.

.3 Substrate Cleaner: non-corrosive type recommended by sealant manufacturer and compatible with adjacent materials.

2.3 ACCESSORIES

.1 Thinner and cleaner for Sheet: as recommended by sheet material manufacturer.

.2 Attachments: as recommended by sheet material manufacturer.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

.1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification and requirements for materials and installation.

.2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

3.3 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept work of this section.

.2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.3 Report unsatisfactory conditions.

.4 Do not start work until deficiencies have been corrected.

.1 Beginning of Work implies acceptance of conditions.

3.4 PREPARATION

.1 Remove loose or foreign matter, which might impair adhesion of materials.

.2 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure substrates are free of surface moisture prior to application of membrane.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Prime substrate surfaces to receive sealants in accordance with manufacturer's instructions.

3.5 INSTALLATION

.1 Install materials in accordance with manufacturer's instructions.

.2 Install sheet seal between window, walls and door frames and adjacent wall seal materials with sealant.

.1 Caulk to ensure complete seal.

.2 Position lap seal over firm bearing.

.6 Apply sealant within recommended application temperature ranges.

.1 Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.7 PROTECTION OF WORK

.1 Protect finished work in accordance with Section 01 61 00.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished work is protected from climatic conditions.

3.9 SCHEDULES

.1 Wall Air/Vapour Barrier Over Exterior Surface of Sheathing:
.1 Place sheet seal Type G over sheathing surfaces with Adhesive Type E.
.2 Seal with Type Y sealant.

.2 Window Frame Perimeter:
.1 Lap sheet seal Type H from wall air seal surface with 75 mm of full contact over firm bearing to window frame with 25 mm of full contact.
.2 Edge seal with Type Z sealant.

.3 Wall and Roof Junction:
.1 Lap sheet seal Type J from wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact.
.2 Seal with Type X sealant.

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)
.1 ANSI A135.6-[06], Hardboard Siding Standard.

.2 Canada Green Building Council (CaGBC)

.3 CSA International
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
.2 CSA O121-08(R2013), Douglas Fir Plywood.
.3 CSA O151-[09], Canadian Softwood Plywood.
.4 CSA Z809-16, Sustainable Forest Management.

.4 Environmental Choice Program (ECP)
.1 CCD-045-[95], Sealants and Caulking Compounds.

.5 Forest Stewardship Council (FSC)
.1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.

.6 National Lumber Grading Authority (NLGA)
.1 NLGA Standard Grading Rules for Canadian Lumber 2014.

.7 Sustainable Forestry Initiative (SFI)
.1 SFI-[2010-2014] Standard.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for [wood siding] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit duplicate 150 x 150 mm size profile specified.

.4 Sustainable Design Submittals:
.1 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.
.3 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

.4 Low-Emitting Materials:
.1 Submit listing of adhesives and sealants used in building, comply with VOC and chemical component limits or restriction requirements.
.2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminate adhesives used in building, stating that they contain no urea-formaldehyde.

.5 Wood Certification: submit FSC or SFI certification of wood products.

1.3 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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 siding from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Lumber siding: to NLGA Standard Grading Rules for Canadian Lumber.
.1 URBAHN prefinished, brushed face in Modern or contemporary profile as provided by Maibec or approved equal.

.2 Accessories: exposed trim, closures, cap pieces of manufacturer's standard finish.

.3 Exterior wall sheathing paper: to CAN/CGSB-51.32, single ply type coated or impregnated.

.4 Fasteners: nails to CSA B111, hot galvanized steel, aluminum, sized as required, spiral type with flat head.

.5 Sealants: See specification section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable 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.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 INSTALLATION

.1 Install hardboard to manufacturers' written instructions.

.2 Install one layer sheathing paper horizontally by stapling, lapping edges 100 mm.

.3 Install sill flashings, wood starter strips, inside corner flashings, edgings and flashings over openings.

.4 Fasten wood siding in straight, aligned lengths to framing and blocking, furring, sheathing using two nails at each fixing location. Intermediate butt joints are not permitted. Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Cut butt joints at 45 degrees. Seal cut surfaces.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

.3 Waste Management: separate waste materials for reuse and recycling.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by wood siding installation.

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 00.01 - Rough Carpentry - Short Form.

.4 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

.1 ASTM International Inc.
.1 Standard Specification for TPO Sheet Used In Single-Ply Roof Membrane.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-51.34-[M86(1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canada Green Building Council (CaGBC)

.4 Canadian Roofing Contractors' Association (CRCA)
.1 CRCA Roofing Specification Manual, current edition
.2 CAN/CSA-A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
.3 CSA O151-09(R2014), Canadian Softwood Plywood.

.5 Factory Mutual (FM Global)
.1 FM Approval Standard # 4470-[86], Class 1 Roof Covers.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 01.

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications and datasheets for membranes and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings:
.1 Provide drawings.
.2 Indicate flashing, penetrations and field fabricated seam details.

.4 Test and Evaluation Reports: submit laboratory test reports certifying compliance of roofing membrane with specification requirements.
.1 Compatibility of materials: submit written declaration to Departmental Representative as described in PART 2, PERFORMANCE CRITERIA.

.5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

1.4 QUALITY ASSURANCE

.1 Installer qualifications: company or person specializing in application of TPO roofing systems with 5 years documented experience approved by manufacturer.

.2 Sustainability Standards Certification:
.1 Recycled Content: provide listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.2 Regional Materials: provide evidence that project incorporates regional materials/products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Storage and Handling Requirements:
.1 Provide and maintain dry, off-ground weatherproof storage.
.2 Store materials on supports to prevent deformation.
.3 Remove only in quantities required for same day use.
.4 Store uncured flashing and jointing materials to prevent premature curing and freezing.
.5 Store roofing materials in accordance with manufacturer's written instructions, to prevent damage or loss of performance.

.3 Packaging Waste Management: remove for reuse and return of pallets, crates and packaging materials.
.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
.2 Fold up metal banding, flatten and place in designated area for recycling.

1.6 FIELD CONDITIONS

.1 Follow safety and health precautions recommended in manufacturer's material safety data sheet.

.1 Ambient Conditions:
.1 Apply TPO membrane only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
.2 Install TPO membrane on dry substrate, free of snow and ice. Use only dry materials and apply only

during weather that will not introduce moisture into system.

1.7 WARRANTY

.1 For the Work of this, 12 months warranty period.

PART 2 - PRODUCTS

2.1 DESCRIPTION - ROOFING SYSTEM

.1 TPO membrane roofing consisting of: 60 mil. White fully adhered membrane with roof edge fastening system. Firestone Ultraply or approved equal.

2.2 PERFORMANCE CRITERIA

.1 Compatibility between components of system and adjacent materials is essential.
.1 Provide a written declaration to Departmental Representative stating that all materials and components, as assembled in system, meet this requirement.

.2 Roofing system: to CAN/CSA-A123.21 for wind uplift resistance.

2.3 DECK COVERING

.1 Plywood: to CSA O121, Sheathing Grade, treated.
.1 15.5 mm thick Tongue and groove.

2.4 VAPOUR RETARDER

.1 Polyethylene: to CAN/CGSB-51.34, Type 1, 6 mil thick.

.2 Add other vapour retardants approved by membrane manufacturer.

2.5 FASTENERS

.1 Sheathing to steel: No.10 flat head, self tapping, Type S, cadmium plated screws to ASTM C1002.

.2 Insulation to substrate: fasteners and plates must meet FM Approval Standard #4470 for wind uplift and corrosion resistance.

.3 Membrane to substrate: fasteners and spacing as recommended by manufacturer.

2.6 ADHESIVES, TAPES AND PRIMERS

.1 Adhesive, tapes and primers, in accordance with manufacturer's recommendations.

2.7 SOURCE QUALITY CONTROL

.1 Provide laboratory test reports certifying compliance of roofing materials with specification requirements as described in PART 1, SUBMITTALS/QUALITY CONTROL.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

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

.2 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual, CRCA Roofing Specification Manual, Provincial/Territorial Roofing Association Manual, and to FM, ULC, except where specified otherwise.

3.2 SUBSTRATE EXAMINATION

.1 Verification of Conditions: examine substrates and immediately inform Departmental Representative in writing of defects.

.2 Evaluation and Assessment: prior to beginning work ensure:
.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
.2 Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover all adjacent work where materials hoisted or used.

.2 Use warning signs and barriers:
.1 Maintain in good order until completion of Work.

.3 Dispose of rain water away from face of building until drains or hoppers installed and connected.

.4 Protect from traffic and damage:
.1 Comply with precautions deemed necessary by Departmental Representative.

.5 Place plywood runways over work to enable movement of material and other traffic.

.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

.7 Seal and ballast exposed edges.

.8 If metal connectors used, treat connectors and decking with rust proofing or galvanization.

3.4 DECK SHEATHING

.1 Mechanically fasten Plywood to steel with screws spaced 400 mm on centre each way.

3.5 VAPOUR RETARDER

.1 Adhere vapour retarder using adhesive as per manufacturer's instructions.

3.6 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

.1 Membrane, adhered, exposed application:
.1 Position membrane over insulation starting at highest point.
.2 Allow membrane to relax for ½ hour.
.3 Apply adhesive to membrane and substrate in accordance with manufacturer's written instructions.

.2 Edge securement:
.1 Attach fastening strips to mechanically secure membrane. Ensure screws penetrate into deck or wood nailers.
.2 Adhesive recommended by manufacturer.

.3 Flashings:
.1 Install TPO membrane flashings in accordance with manufacturer's written instructions.

.4 Penetrations:
.1 Install vent stack covers and other penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.17 FIELD QUALITY CONTROL

.1 Inspection:
.1 Inspection and testing of EPDM membrane application will be carried out by testing laboratory designated by Departmental Representative.
.2 Departmental Representative will pay for tests.
.3 Flood test roof.

3.18 CLEANING

.1 Clean Work in accordance with Section 01 11 01.

.2 Clean to Departmental Representative's approval, soiled surfaces, spatters, and damage caused by Work of this Section.

.3 Remove debris, equipment and excess material from site.

.4 Waste Management: separate waste materials for reuse and recycling.

PART 1 - GENERAL

1.1 REFERENCES

.1 The Aluminum Association Inc. (AAI)
- .1 AAI-Aluminum Sheet Metal Work in Building Construction-[2002].
- .2 AAI DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)
- .1 ASTM A606/A606M-15, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .2 ASTM B32-08(2014), Standard Specification for Solder Metal.
- .7 ASTM B370-12, Standard Specification for Copper Sheet and Strip for Building Construction.
- .8 ASTM D523-14, Standard Test Method for Specular Gloss.

.3 Canada Green Building Council (CaGBC)

.4 Canadian Roofing Contractors Association (CRCA)
- .1 Roofing Specifications Manual 2012.

.5 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.32-[M77], Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-93.1-[M85], Sheet Aluminum Alloy, Prefinished, Residential.

.6 Canadian Standards Association (CSA International)
- .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, Standard/Specification for Windows, Doors, and Unit Skylights.
- .2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.7 Green Seal Environmental Standards
- .1 Standard GS-03-[93], Anti-Corrosive Paints.
- .2 Standard GS-11-[97], Architectural Paints.
- .3 Standard GS-36-[00], Commercial Adhesives.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 01.

.2 Product Data:
- .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Samples:

.1 Submit duplicate [50 x 50] mm samples of each type of sheet metal material, finishes and colours.

.3 Quality assurance submittals: submit following in accordance with Section 01 11 01.
.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Verify project requirements.
.1 Review installation and substrate conditions.
.2 Co-ordination with other building subtrades.
.3 Review manufacturer's written installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 11 01.

.2 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester.
.1 Class F1S.
.2 Colour selected by Departmental Representative from manufacturer's standard range.
.3 Specular gloss: [30] units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 25 micrometres.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822/D822M as follows:
.1 Outdoor exposure period 1000 hours.
.2 Humidity resistance exposure period 1000 hours.

2.2 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB-37.5.

.3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32 or No. 15 perforated asphalt felt to CSA A123.3.

.4 Sealants: As per Section 07 92 00.

.5 Cleats: of same material, and temper as sheet metal, minimum [50] mm wide. Thickness same as sheet metal

being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Solder: to ASTM B32, alloy composition.

.9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.

.10 Touch-up paint: as recommended by prefinished material manufacturer.

2.3 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details and as per drawings.

.2 Form pieces in 2400 mm maximum lengths.
.1 Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm.
.1 Mitre and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.4 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated.

2.5 REGLETS AND CAP FLASHINGS

.1 Form as detailed on drawings and to CRCA FL series details.
.1 Provide slotted fixing holes and steel/plastic washer fasteners.

2.9 EAVES TROUGHS AND DOWNPIPES

.1 Form eaves troughs and downpipes as shown on the drawings. Provide goosenecks, outlets, strainer baskets and necessary fastenings.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

instructions, and datasheets.

3.2 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as per drawings.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal.
.1 Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
.1 Flash joints using S-lock forming tight fit over hook strips, and as as detailed.

.5 Lock end joints and caulk with sealant.

3.3 EAVES TROUGHS AND DOWNPIPES

.1 Install eaves troughs and secure to building at [750] mm on centre with eaves trough spikes through spacer ferrules.
.1 Slope eaves troughs to downpipes as indicated.
.2 Solder joints watertight.

.2 Install downpipes and provide goosenecks back to wall.
.1 Secure downpipes to wall with straps at [1800] mm on centre; minimum two straps per downpipe.

3.6 CLEANING

.1 Proceed in accordance with Section 01 11 01.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

.2 Text to complete other various Sections containing sealant or caulking specifications.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.
.2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.

.2 Canadian General Standards Board (CGSB)
.1 CGSB 19-GP-5M-latest edition, Sealing Compound, One Component, Acrylic Base, Solvent Curing.
.2 CAN/CGSB-19.13-latest edition, Sealing Compound, One-component, Elastomeric, Chemical Curing.
.3 CGSB 19-GP-14M-latest edition, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
.4 CAN/CGSB-19.17-latest edition, One-Component Acrylic Emulsion Base Sealing Compound.
.5 CAN/CGSB-19.24-latest edition, Multi-component, Chemical Curing Sealing Compound.

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00.

.2 Manufacturer's product to describe.
.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions.
.1 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels,

intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.6 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.

.8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

.9 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4°C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

.3 Use only primers approved by the sealant manufacturer.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.
.1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25, colour to match adjacent materials.

.2 Silicones One Part.
.1 To CAN/CGSB-19.13, primerless, Type S, Grade NS, Class 25, SWRI validated.
.1 Acceptable material: Tremco, G.E or Dow corning.
.2 Mildew resistant
.3 Colour to match adjacent materials.

.3 Acrylics One Part.
.1 To CGSB 19-GP-5M.
.2 Acceptable material: Tremco, DAP. Colour to match adjacent materials.

.4 Butyl.
.1 To CGSB 19-GP-14M.
.2 Acceptable material: Tremco.

.5 Preformed Compressible and Non-Compressible back-up materials.
.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
.1 Extruded open or closed cell foam backer rod.
.2 Size: oversize 30 to 50%.
.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.6 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/mü density, or neoprene foam backer, size as recommended by manufacturer.

.7 Bond Breaker Tape.

.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Seal all dissimilar material joints on the xterior and interior of the building.

.2 Perimeters of interior frames.

.3 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: silicone.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A653/A653M-13, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM B29-14, Standard Specification for Refined Lead.
- .3 ASTM B749-14, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .4 ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .5 ASTM E413-10, Classifications for Rating Sound Insulation.
- .6 ASTM E1332-10a, Standard Classification for Rating Outdoor-Indoor Sound Attenuation.

.2 Canada Green Building Council (CaGBC)

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.4 Canadian Standards Association (CSA International)
- .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.5 Canadian Steel Door Manufacturers' Association (CSDMA)
- .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2006.
- .2 CSDMA, Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.

.6 National Fire Protection Association (NFPA)
- .1 NFPA 80-2013, Standard for Fire Doors and Other Opening Protectives.
- .2 NFPA 252-2012, Standard Methods of Fire Tests of Door Assemblies.

.7 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
- .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
- .3 CAN/ULC-S701-11, Standard for Thermal

Insulation, Polystyrene, Boards and Pipe Covering.
.4 CAN/ULC-S702-14, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
.5 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.2 SYSTEM DESCRIPTION

.1 Design Requirements:
.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.

.2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.3 SUBMITTALS

.1 Provide submittals, shop drawings and product data in accordance with Section 01 33 00.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware and finishes.
.1 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing.
.2 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
.3 Submit test and engineering data, and installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00.

.2 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Hot dipped galvanized steel sheet: to ASTM A653/A653M, [ZF75], minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts, minimum 30% recycled content.

.2 Reinforcement: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/A653M, [ZF75].

2.2 DOOR CORE MATERIALS

.1 Honeycomb construction:
.1 Structural small cell, 24.5 mm maximum kraft

paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/mü minimum sanded to required thickness.

.2 Stiffened: face sheets welded, insulated core.

2.3 ADHESIVES

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

.3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.4 PRIMER

.1 Touch-up prime CAN/CGSB-1.181.

2.5 PAINT

.1 Field paint steel doors and frames in accordance with Section 09 91 99. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.

2.6 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior and interior top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.4 Door hardware including hinges, lockset, weatherstripping and sweep..

.5 Sealant: Section 07 92 00.

.6 Glazing: Section 08 80 50.

.9 Make provisions for glazing as indicated and provide necessary glazing stops.
.1 Provide removable stainless steel glazing beads for dry glazing of snap-on type.
.2 Design exterior glazing stops to be tamperproof.

2.7 FRAMES FABRICATION GENERAL

.1 Fabricate frames in accordance with CSDMA specifications.

.2 Fabricate frames to profiles and maximum face sizes as indicated.

.3 Exterior frames: 1.6mm welded, thermally broken type construction.

.4 Interior frames: 1.6 mm welded, type construction.

.5 Blank, reinforce, drill and tap frames for mortised, templated hardware, [and] [electronic hardware] using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

.6 Protect mortised cutouts with steel guard boxes.

.7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.

.8 Manufacturer's nameplates on frames and screens are not permitted.

.9 Conceal fastenings except where exposed fastenings are indicated.

.10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.11 Insulate exterior frame components with polyurethane insulation.

2.8 FRAME ANCHORAGE

.1 Provide appropriate anchorage to floor and wall construction.

.2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

.3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

2.9 FRAMES: WELDED TYPE

.1 Welding in accordance with CSA W59.

.2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.

.3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.

.4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.

.5 Securely attach floor anchors to inside of each jamb profile.

.6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.12 DOOR FABRICATION GENERAL

.1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

.2 Exterior doors: hollow steel construction. Interior doors: honeycomb construction.

.3 Fabricate doors with longitudinal edges locked seamed, adhesive assisted. Seams: visible.

.4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketting and hardware in accordance with ASTM E330/E330M.

.5 Blank, reinforce, drill doors and tap for mortised, templated hardware.

.6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.

.7 Reinforce doors where required, for surface mounted hardware. Provide flush steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Manufacturer's nameplates on doors are not permitted.

2.14 HOLLOW STEEL CONSTRUCTION

.1 Form face sheets for exterior doors from 1.6 mm sheet steel.

.2 Form face sheets for interior doors from 1.6mm sheet steel.

.3 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.

.4 Fill voids between stiffeners of exterior doors with polyurethane core.

2.15 THERMALLY BROKEN DOORS AND FRAMES

.1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.

.2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Fabricate thermally broken frames separating exterior parts form interior parts with continuous interlocking thermal break.

.4 Apply insulation.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION GENERAL

.1 Install doors and frames to CSDMA Installation Guide.

3.3 FRAME INSTALLATION

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.5 Caulk perimeter of frames and adjacent materials.

.6 Maintain continuity of air barrier and vapour retarder.

3.4 DOOR INSTALLATION

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.

.2 Adjust operable parts for correct function.

.3 Install louvres.

3.5 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 GLAZING

.1 Install glazing for doors and frames.

PART 1 - GENERAL

1.1 REFERENCES

.1 American Architectural Manufacturers Association (AAMA)
- .1 AAMA 609/610-[09], Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

.2 ASTM International
- .1 ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.3 Canada Green Building Council (CaGBC)

.4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
- .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.

.5 CSA International
- .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.6 Environmental Choice Program (ECP)
- .1 CCD-045-[95], Sealants and Caulking Compounds.

.7 Green Seal Environmental Standards (GS)
- .1 GS-11-[2008, 2nd Edition], Paints and Coatings.

.8 The Master Painters Institute (MPI) / Architectural Painting Specification Manual - [February 2004].
- .1 MPI# 79 - Primer, Alkyd, Anti-Corrosive for Metal.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for [doors and frames] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submit drawings stamped.
- .2 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:

.1 Interior trim and exterior junctions with adjacent construction.
.2 Junctions between combination units.
.3 Elevations of units.
.4 Core thicknesses of components.
.5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.
.6 Location of caulking.
.7 Each type of door system including location.
.8 Arrangement of reinforcing for hardware and joints.
.9 Arrangement of hardware and required clearances.

.4 Samples:
.1 Submit one [300 x 300] mm corner sample of each type door and frame.
.4 Submit sample showing glazing detail, reinforcement, finish and location of manufacturer's nameplates.
.5 Frame sample to show glazing stop, door stop, jointing detail, finish.
.6 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.
.7 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.8 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
.9 Low-Emitting Materials:
.1 Submit listing of adhesives and sealants and paints and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual.

1.4 QUALITY ASSURANCE

.1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Apply temporary protective coating to finished surfaces. Remove coating after erection. Use coatings that are easy to remove and residue free.
.2 Leave protective covering in place until final cleaning of building.

.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 aluminum doors and frames from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

.1 Design frames and doors in exterior walls to:
.1 Accommodate expansion and contraction within service temperature range of [-35] to [35] degrees C.
.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330/E330M under wind load of [1.2] kPa [submit certificate of tests performed].
.3 Movement within system.
.4 Movement between system and perimeter framing components or substrate.

.2 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.

.3 Design door system to provide average thermal resistance of:
.1 Door system (excluding vision glass areas): unisulated.
.2 Vision glass areas: singe glazed.

.4 Include continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

2.2 MATERIALS

.1 Aluminum extrusions: to Aluminum Association alloy AA 6063-T5 anodizing quality.

.2 Sheet aluminum: to Aluminum Association alloy AA 1100-H14 anodizing quality.

.3 Steel reinforcement: to CSA G40.20/G40.21, grade 300 W.

.4 Fasteners: aluminum, finished to match adjacent material.

.5 Weatherstrip: replaceable plastic.

.6 Door bumpers: black neoprene.

.7 Door bottom seal: adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, surface mounted with drip cap, closed ends.

.8 Isolation coating: alkali resistant bituminous paint.

.9 Glass: clear tempered safety glass to CAN/CGSB-12.1, Type 1, Class A, single pane.

.10 Sealants: colour to match adjacent materials.
.1 Maximum VOC limit: [250] [g/L] [5% by weight] to SCAQMD Rule 1168 and CCD-045.

2.3 ALUMINUM DOORS

.1 Construct doors of porthole extrusions with minimum wall thickness of 3 mm.

.2 Door stiles and rails dimensioned as per drawings.

.3 Reinforce mechanically-joined corners of doors to produce sturdy door unit.

.4 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.

.5 Supply thermally broken doors for exterior.

.6 By manufacturer of doors and as per Section 08 71 00.

2.4 ALUMINUM FRAMES

.1 Construct thermally broken and insulated frames of aluminum extrusions with minimum wall thickness to support structural loads, including wind. Minimum thickness 3mm.

.2 Frame members sized as per drawings nominal size, for flush glazing.

2.5 ALUMINUM FINISHES

.1 Clear anodic finish: to designation AA-A31.

.2 Appearance and properties of anodized finishes designated by Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

2.6 STEEL FINISHES

.1 Finish steel clips and reinforcing steel with zinc coating to ASTM A123/A123M.
.1 Primer VOC limit: to GS-11, [250] g/L maximum.

2.7 FABRICATION

.1 Doors and framing to be by same manufacturer.

.2 Fabricate doors and frames to profiles and maximum face sizes as indicated.

.3 Provide structural steel reinforcement as required.

.4 Fit joints tightly and secure mechanically.

.5 Conceal fastenings.

.6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates.

.7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for aluminum doors and frames 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.

3.2 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Set frames plumb, square, level at correct elevation in alignment with adjacent work.

.3 Anchor securely.

.4 Install doors and hardware in accordance with hardware

templates and manufacturer's instructions.

.5 Adjust door components to ensure smooth operation.

.6 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

.7 Glaze aluminum doors and frames in accordance with Section 08 80 50.

.8 Seal joints to provide weathertight seal at outside and air, vapour seal at inside.

.9 Apply sealant in accordance with Section 07 92 00. Conceal sealant within the aluminum work except where exposed use is permitted by Departmental Representative.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.1 Leave Work area clean at end of each day.
.2 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
.3 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
.4 Clean aluminum with damp rag and approved non-abrasive cleaner.
.5 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.
.6 Clean glass and glazing materials with approved non-abrasive cleaner.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

.3 Waste Management: separate waste materials for reuse and recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by aluminum door and frame installation.

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI) / Hardwood Plywood & Veneer Association (HPVA):
.1 ANSI/HPVA HP-1-[2009],American National Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada/ Woodwork Institue (AWI/AWMAC/WI):
.1 AWI/AWMAC/WI Architectural Woodwork Standards, AWS Edition 1-2009.

.3 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-71.19-[M88], Adhesive, Contact, Sprayable.
.2 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.

.4 Canadian Standards Association (CSA International).
.1 CSA A440.2-09/A440.3-09, Fenestration Energy Performance/User Guide to CSA A440.2-09 Fenestration Energy Performance.
.2 CAN/CSA-O132.2 Series-90(R2003), Wood Flush Doors.
.3 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.
.4 CSA Z809-16, Sustainable Forest Management.
.5 CSA Certification Program for Windows and Doors [00].

.5 Environmental Choice Program (ECP).
.1 CCD-045-[92], Sealants and Caulking Compounds.
.2 CCD-046-[92], Adhesives.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section [01 33 00].
.2 Shop Drawings:
.3 Submit shop drawings.
.4 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.

1.3 SAMPLES

.1 Show door construction, core, glazing detail and faces.

.2 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:
.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.
.2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
.3 Protect doors from scratches, handling marks and other damage.
.4 Store doors away from direct sunlight.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

.3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Departmental Representative.

.5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.3 STILE AND RAIL DOORS

.1 Fabricate doors as indicated to AWI/AWMAC/WI.

.2 Construction:
.1 Residential grade: to AWI/AWMAC/WI Architectural Woodwork Standards, exterior and interior solid construction.
.2 Architectural grade veneered doors: to AWMAC mortise and tenon joints, vertical edge AWI/AWMAC/WI Architectural Woodwork Standards Detail No.[1], stile and rail widths to [AWI/AWMAC/WI Architectural

Woodwork Standards] Type I (exterior), Type II (interior) adhesive.

.3 Type: louvred door.

2.5 GLAZING

.1 Glass: 6mm clear tempered, safety glass.

2.8 FABRICATION

.1 Vertical edge strips to match face veneer.

.2 Prepare doors for louvres.

.3 Bevel vertical edges of single acting doors 3 mm in 50 mmon lock side and 1.5 mm in 50 mm on hinge side.

.4 Radius vertical edges of double acting doors to 60 mm radius.

.5 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

.1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.

.2 Install labelled fire rated doors to NFPA 80.

.3 Install doors and hardware in accordance with manufacturer's printed instructions [and CAN/CSA-O132.2 Series, Appendix A].

.4 Adjust hardware for correct function.

.5 Install louvres and stops.

3.3 ADJUSTMENT

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.4 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved

non-abrasive cleaner.

.4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/ Builders Hardware Manufacturers Association (BHMA)
- .1 ANSI/BHMA A156.9-[2010], Cabinet Hardware.
- .2 ANSI/BHMA A156.11-[2010], Cabinet Locks.
- .3 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
- .4 ANSI/BHMA A156.18-2012, Materials and Finishes.
- .5 ANSI/BHMA A156.20-2006(R2012), Strap and Tee Hinges and Hasps.

.2 Canada Green Building Council (CaGBC)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for [cabinet hardware] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
- .1 All hardware items.

.4 Hardware List:
- .1 Submit contract hardware list.
- .2 Indicate specified hardware, including make, model, material, function, finish and other pertinent information.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions: submit manufacturer's installation instructions.

.1 Construction Waste Management:
- .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
- .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.

.2 Recycled Content:
- .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.3 Regional Materials: submit evidence that project

incorporates rgional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for cabinet hardware for incorporation into manual.

1.4 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.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 cabinet hardware] from nicks, scratches, and blemishes.
.3 Protect prefinished surfaces with wrapping.
.4 Replace defective or damaged materials with new.

.5 Develop Construction Waste Management Plan related to Work of this Section.

.6 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

.1 Use one manufacturer's product for all similar items.

2.2 CABINET HARDWARE

1 Cabinet hardware: to ANSI/BHMA A156.9, designated by letter B and numeral identifiers as listed below.
.1 Hinges: concealed self closing hige, brushed nickel finish.
.2 Pulls: back mounted D pull, brushed nickel

finish.
.3 Knobs: back mounted surface mounted knob, brushed nickel finish.
.4 Latches: touch or secret panel latch, brushed nickel finish.
.5 Catches: touch or secret panel catch, brushed nickel finish.
.6 Shelf brackets [and standards]: shelf support, see drawings, vertical slotted shelf standard, type , with shelf brackets, 305mm wide shelves, finished to brushed nickel finish.
.7 Drawer slides: side mounted] drawer slides.

2.3 MISCELLANEOUS HARDWARE

.1 Strap and tee hinges and hasps: to ANSI/BHMA A156.20, designated by letter A and numeral identifiers listed in Hardware Schedule, zinc plated.

.3 Closet shelf supports: heavy duty adjustable [folding] support with brace for shelf and closet rod, finished to 603 (zinc plated).

2.4 FASTENINGS

.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation 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 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Install hardware to standard hardware location dimensions in accordance with manufacturer's recommendations and to project design requirements.

.3 Install key control cabinet and establish key control set-up.

3.2 ADJUSTING

.1 Adjust cabinet hardware for optimum, smooth operating condition.

.2 Lubricate hardware and other moving parts.

.3 Adjust cabinet door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.1 Leave Work area clean at end of each day.
.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
.3 Remove protective material from hardware items where present.
.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

.2 Waste Management: separate waste materials for reuse and recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 DEMONSTRATION

.1 Keying System Setup and Cabinet:
.1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
.2 Place file keys and duplicate keys in key cabinet on their respective hooks.
.3 Lock key cabinet and turn over key to Departmental Representative.

.2 Maintenance Staff Briefing:
.1 Brief maintenance staff regarding:
.1 Proper care, cleaning, and general maintenance of projects complete hardware.
.2 Description, use, handling, and storage of keys.

.3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by cabinet and miscellaneous hardware installation.

3.6 SCHEDULE

.1 Cabinet drawers: [group A].
.1 1 set drawer slides [B05052].
.2 1 lock [kd] [E07212].
.3 1 handle pull [B02011] [626].

.2 Cabinet swinging doors: [group B].
.1 1 pair hinges [B01262] [626].
.2 1 knob pull [B02131] [626].
.3 1 magnetic catch [B03152].

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 08 11 00, Section 08 11 16, Section 08 14 16.

1.2 REFERENCES

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
- .1 ANSI/BHMA A156.1-2013, American National Standard for Butts and Hinges.
- .2 ANSI/BHMA A156.2-[2011], Bored and Preassembled Locks and Latches.
- .3 ANSI/BHMA A156.3-2014, Exit Devices.
- .4 ANSI/BHMA A156.4-2013, Door Controls - Closers.
- .5 ANSI/BHMA A156.5-2014, Auxiliary Locks and Associated Products.
- .6 ANSI/BHMA A156.6-2010, Architectural Door Trim.
- .7 ANSI/BHMA A156.8-[2010], Door Controls - Overhead Stops and Holders.
- .8 ANSI/BHMA A156.10-2011, Power Operated Pedestrian Doors.
- .9 ANSI/BHMA A156.12-2013, Interconnected Locks and Latches.
- .10 ANSI/BHMA A156.13-[2012], Mortise Locks and Latches Series 1000.
- .11 ANSI/BHMA A156.14-2013, Sliding and Folding Door Hardware.
- .12 ANSI/BHMA A156.15-[2011], Release Devices - Closer Holder, Electromagnetic and Electromechanical.
- .13 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
- .14 ANSI/BHMA A156.17-2014, Self-closing Hinges and Pivots.
- .15 ANSI/BHMA A156.18-2012, Materials and Finishes.
- .16 ANSI/BHMA A156.19-2013, Power Assist and Low Energy Power - Operated Doors.
- .17 ANSI/BHMA A156.20-2006(R2012), Strap and Tee Hinges and Hasps.
- .18 ANSI/BHMA A156.21-2014, Thresholds.
- .19 ANSI/BMHA A156.22-2012, Door Gasketing and Edge Seal Systems.

.2 Canada Green Building Council (CaGBC)

.3 Canadian Steel Door Manufacturers' Association (CSDMA)
- .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section [01 33 00].

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for [door hardware] and include product characteristics, performance

criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.
.3 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
.4 After approval samples will be returned for incorporation in Work.

.4 Hardware List:
.1 Submit contract hardware list.
.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions: submit manufacturer's installation instructions.

.7 .1 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.
.3 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.4 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for [door hardware] for incorporation into manual.

1.5 MAINTENANCE MATERIALS SUBMITTALS

.1 Extra Stock Materials:
.2 Supply maintenance materials in accordance with Section 01 78 00.
.3 Tools:
.1 Supply [2] sets of wrenches for locksets.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements:

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.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 door hardware from nicks, scratches, and blemishes.
.3 Protect prefinished surfaces with wrapping.
.4 Replace defective or damaged materials with new.

.5 Develop Construction Waste Management Plan related to Work of this Section.

.6 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

.1 Locks and latches:
.1 Bored and preassembled locks and latches: to ANSI/BHMA A156.2, series 4000 bored lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
.2 Interconnected locks and latches: to ANSI/BHMA A156.12, series 5000 interconnected lock, grade [1] , designed for function [and keyed] as stated in Hardware Schedule.
.3 Mortise locks and latches: to ANSI/BHMA A156.13, series 1000 mortise lock, grade [1], designed for function and keyed as stated in Hardware Schedule.
.4 Lever handles: plain design.

.5 Escutcheons: round.
.6 Normal strikes: box type, lip projection not beyond jamb.
.7 Cylinders: key into keying system as directed.
.8 Finished to [_____].

.2 Butts and hinges:
.1 Butts and hinges: to ANSI/BHMA A156.1, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.

.3 Auxiliary locks and associated products: to ANSI/BHMA A156.5, brushed nickel finish.
.1 Latch bolt, Dead bolt. Key into keying system as directed.
.2 Cylinders: finished to brushed nickel, for installation in deadlocks provided with special doors as listed in Hardware Schedule. Key into keying system as directed.

.4 Sliding and folding door hardware: to ANSI/BHMA A156.14, brushed nickel finish or clear anodized on aluminum frames or doors.

.5 Door bottom seal: heavy duty, door seal of extruded aluminum frame and closed cell neoprene weather seal, surface mounted with drip cap, clear anodized finish].

.6 Thresholds: 50 mm wide x full width of door opening, extruded aluminum serrated surface.

.7 Weatherstripping:
.1 Head and jamb seal:
.1 Extruded aluminum frame and closed cell neoprene clear anodized finish.
.2 Door bottom seal:
.1 Extruded aluminum frame and closed cell neoprene, clear anodized finish.

2.4 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.5 KEYING

.1 Doors, padlocks and cabinet locks to be keyed aliked Prepare detailed keying schedule in conjunction with Departmental Representative.

.2 Supply keys in duplicate for every lock in this Contract.

.3 Stamp keying code numbers on keys and cylinders.

.4 Supply construction cores.

.5 Hand over permanent cores and keys to Departmental Representative.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Supply manufacturers' instructions for proper installation of each hardware component.

.4 Install hardware to standard hardware location dimensions in accordance with CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).

.5 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.6 Install key control cabinet.

.7 Use only manufacturer's supplied fasteners.
.1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.8 Remove construction cores when directed by Departmental Representative.
.1 Install permanent cores and ensure locks operate correctly.

3.2 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section [01 74 11].
.1 Leave Work area clean at end of each day.
.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
.3 Remove protective material from hardware items where present.
.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 DEMONSTRATION

.1 Keying System Setup and Cabinet:
.1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
.2 Place file keys and duplicate keys in key cabinet on their respective hooks.
.3 Lock key cabinet and turn over key to Departmental Representative.

.2 Maintenance Staff Briefing:
.1 Brief maintenance staff regarding:
.1 Proper care, cleaning, and general maintenance of projects complete hardware.
.2 Description, use, handling, and storage of keys.
.3 Use, application and storage of wrenches for locksets.

.3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by door hardware installation.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1 Section 08,11 16.

1.2 REFERENCES

.1 ASTM International
.1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets.
.2 ASTM D790-10, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
.3 ASTM D1003-13, Standard Test Method for Haze and Luminous Transmittance of Plastics.
.4 ASTM D1929-13a, Standard Test Method for Determining Ignition Temperature of Plastics.
.5 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.
.6 ASTM E84-14, Standard Test Method for Surface Burning Characteristics of Building Materials.
.7 ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
.8 ASTM F1233-08(2013), Standard Test Method for Security Glazing Materials and Systems.

.2 Canada Green Building Council (CaGBC).

.3 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.4 Environmental Choice Program (ECP)
.1 CCD-045-[95(R2005)], Sealants and Caulking Compounds.

.5 Glass Association of North American (GANA)
.1 GANA Glazing Manual 50th Anniversay Edition-[2008].
.2 GANA Laminated Glazing Reference Manual - [2009].
.3 GANA Sealant Manual-2008.
.4 GANA Laminated Glazing Reference Manual (2009).
.5 GANA Guide to Architectural Glass (2010).
.6 GANA/PGC International Protective Glazing Manual (2010).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:
.1 .1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other building subtrades.

.2 Review manufacturer's written installation instructions and warranty requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for [glass, sealants, and glazing accessories] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings.

.2 Submit duplicate mm size samples.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Sustainable Design Submittals:
.1 onstruction Waste Management:
.1 Submit project Waste Management Plan] highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.
.3 Recycled Content:
.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
.4 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
.5 Low-Emitting Materials:
.1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restrictions requirements.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for [glazing] for incorporation into manual.

1.6 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 glazing and frames from [nicks, scratches, and blemishes].
.3 Protect prefinished aluminum surfaces with wrapping.
.4 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

1.8 AMBIENT CONDITIONS

.1 Ambient Requirements:

.1 Install glazing when ambient temperature is [10] degrees C minimum. Maintain ventilated environment for 24 hours after application.
.2 Maintain minimum ambient temperature before, during and [24] hours after installation of glazing compounds.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Design Criteria:
.1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
.1 Single glazed clear, tempered safety glass

min. 6mm.
.2 Size glass to withstand wind loads, dead loads and positive and negative live loads [acting normal to plane of glass to design pressure to ASTM E330.
.3 Limit glass deflection to [1/200] [flexural limit of glass] with full recovery of glazing materials.

.2 Sealant: in accordance with Section [07 92 00].

2.2 ACCESSORIES

.1 Setting blocks: neoprene, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square meter of glazing.

.2 Spacer shims: neoprene, 50-60 Shore A durometer hardness to ASTM D2240, [75] mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device], 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper, black colour.

.4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot.

.5 Glazing clips: manufacturer's standard type.

.6 Lock-strip gaskets: to ASTM C542.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
.1 Verify that openings for glazing are correctly sized and within tolerance.
.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
.3 Visually inspect substrate in presence of Departmental Representative.
.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.5 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative].

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)

.1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Perform work in accordance with [GANA Glazing Manual] [and] [GANA Laminated Glazing Reference Manual] for [glazing installation methods].

.3 Cut glazing [tape] [spline] to length; install on glazing light. Seal corners by butting [tape] [spline] and sealing junctions with sealant in accordance with GANA Sealant Manual.

.4 Place setting blocks at [1/4] [1/3] points, with edge block maximum [150] mm from corners.

.5 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.6 Install removable stops without displacing glazing [tape] [spline]. Exert pressure for full continuous contact.

.7 Trim protruding tape edge.

3.11 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.

.1 Leave Work area clean at end of each day.

.1 Remove traces of primer, caulking.

.2 Remove glazing materials from finish surfaces.

.3 Remove labels.

.4 Clean glass [and mirrors] using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

.2 Waste Management: separate waste materials for reuse and recycling

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.12 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 10 01.

1.2 REFERENCES

.1 ASTM International
- .1 ASTM D2369-10(2015)e1, Standard Test Methods for Volatile Content of Coatings.
- .2 ASTM D2832-92(2016), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.2 Canada Green Building Council (CaGBC)

.3 Canadian General Standards Board (CGSB)
- .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction (and Amendment-88).

.4 Canadian Lumbermen's Association (CLA)
- .1 CLA Grading Rules for Canadian Hardwood Strip Flooring current edition.

.5 CSA International
- .1 CSA A123.3-05(2015), Asphalt Saturated Organic Roofing Felt.
- .2 CSA O151-09(R2014), Canadian Softwood Plywood.
- .3 CSA O325-07(R2012), Construction Sheathing.
- .4 CSA Z809-16, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001- current edition, FSC Principle and Criteria for Forest Stewardship.

.7 Sustainable Forestry Initiative (SFI)
- .1 SFI-[2010-2014] Standard.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for wood strip plank flooring and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
- .1 Submit for review and acceptance of each unit.
- .2 Submit duplicate 300 mm long samples of finish flooring strips.

.4 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Sustainable Design Submittals:

.1 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.

.3 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.4 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

.5 Wood Certification: submit manufacturer's FSC or SFI certificate.

.6 Low-Emitting Materials:

.1 Submit listing of adhesives and sealants and paints and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.

.2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for flooring for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Sustainable Standards Certification:

.1 Certified Wood: submit listing of wood products and materials used in accordance with CSA Z809 or FSC or SFI.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Ensure concrete, masonry, sheet rock, paint and framing members are thoroughly dry before flooring is delivered.
.2 Do not truck or unload flooring in rain, snow or excessively humid conditions.

.3 Storage and Handling Requirements:
.1 Store materials in fully enclosed ventilated, clean and dry storage space for 72 hours minimum before starting of work.
.1 Open packaging and allow 72 hours for wood to acclimatize in accordance with manufacturer's written recommendations..
.2 Cover flooring with tarpaulin or vinyl if atmosphere is foggy or damp.
.3 Leave adequate room for good air circulation around stacks of flooring.
.4 Divide flooring into small lots and store in spaces where it will be installed.
.5 Store and protect wood flooring from nicks, scratches, and blemishes.
.6 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

1.8 SITE CONDITIONS

.1 Site Requirements:
.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.

.2 Ambient Conditions:
.1 Ventilation:
.1 Provide continuously during and after installation.
.2 Temperature:
.1 Maintain ambient temperature minimum of 18 degrees C and minimum of 21 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.2 Maintain minimum temperature 10 degrees C within area of installation.
.3 Ensure substrate is within moisture limits prescribed by flooring manufacturer.
.4 Maintain heat and humidity levels near occupancy levels for 5 days prior to delivery and until sanding and finishing are complete during winter months.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Sustainability Characteristics:
.1 Adhesives and Sealants:
.1 Adhesives in accordance with Section 07 92 00.
.2 VOC limit 100 g/L maximum to SCAQMD Rule 1168.

.2 Coating:
.1 Coating in accordance with manufacturer's recommendations for surface conditions:
.2 VOC limit 275 g/L maximum to SCAQMD Rule 1113.

.2 Bamboo flooring.

.3 Subfloor:
.1 Sheathing:
.1 Plywood to CSA O151, sheathing grade.
.2 No. 1 group 1 softwood suitable for subfloors, Exterior sheathing grade plywood.
.3 See drawing for thicknesses.

.4 Mastic: type recommended by flooring material manufacturer.

.5 Waterproofing Membrane:
.1 Polyethelene film: to CAN/CGSB-51.34 and CCD-126, Type 2, 0.15 mm thick.
.2 Asphalt saturated felt: to CSA A123.3, No.15 organic felt.

.6 Asphalt primer: to CGSB 37-GP-9Ma.

.7 Wood base: as shown on the drawings.

.8 Aluminum Thresholds: as shown on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood strip and plank flooring installation in accordance with

manufacturer's written instructions.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Check and record moisture content of both flooring and subflooring before beginning installation.
.1 Ensure moisture content is within acceptable limits in accordance with manufacturer's written recommendations.

.2 Wood Subfloor:
.1 Sheet Underlayment:
.1 Install with grain of faces at right angles to joists.
.2 Nail every [150] mm along each joist.
.3 Subfloor: flat, clean, dry, structurally sound and free of squeaks and protruding nails and/or staples.
.4 Nailing Schedule: adequate, typically every [150] mm along panel ends and every [300] mm along intermediate supports.
.5 Nail spacing evident on panel edges.
.6 Flatten edge swell as required.
.7 Sweep subfloor clean.

3.3 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Install No.15 felt directly below finish flooring.

.3 Install finish flooring, as indicated, parallel to long dimension of room.

.4 Machine nail fastening. Maintain tight joints and board ends. Install to manufacturer's written instructions.

.5 Install base continuously at floor perimeter. Secure to wall surface with screws and plugs. Ensure base does not contact floor surface and is not secured to it.

.6 Install thresholds at openings. Attach threshold to adjacent rigid floor surface. Threshold to act as ramp between floor surfaces over expansion space.

3.4 FIELD QUALITY CONTROL

.1 Install as per manufacturers written instructions.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.

.1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
.1 Clean flooring and base surfaces to flooring manufacturer's printed instructions.

.2 Waste Management: separate waste materials for reuse and recycling

3.6 PROTECTION

.1 Protect new floors until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

.3 Repair damage to adjacent materials caused by wood strip plank flooring installation.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 20 00, Section 07 46 23, Section 07 62 00.

1.2 REFERENCES

.1 Canada Green Building Council (CaGBC)

.2 Green Seal Environmental Standards (GS)
.1 GS-11-[2008, 2nd Edition], Paints and Coatings.

.3 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - current edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for [paint and coating products] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.3 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating what % of construction wastes were recycled or salvaged.
.3 Regional Materials: submit evidence that project incorporates regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
.4 Low-Emitting Materials:
.1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Provide and maintain dry, temperature controlled, secure storage.
.2 Store painting materials and supplies away from heat generating devices.
.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.

.4 Fire Safety Requirements:
.1 Supply 1 9 kg Type ABC fire extinguisher adjacent to storage area.
.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.5 Develop Construction Waste Management Plan related to Work of this Section.

.6 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan.

1.5 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:
.1 Ventilate enclosed spaces in accordance with Section 01 51 00.
.2 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.
.2 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:
.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Supply paint materials for paint systems from single manufacturer.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.
.1 Use MPI listed materials having E2 rating where indoor air quality requirements exist.
.2 Primer: VOC limit 100 g/L maximum to GS-11 or SCAQMD Rule 1113.
.3 Paint: VOC limit 100 g/L maximum to GS-11 or SCAQMD Rule 1113.

.4 Colours:
.1 Submit proposed Colour Schedule for review.
.2 Base colour schedule on selection of 3 base colours and 2 accent colours.

.5 Mixing and tinting:
.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written recommendations. Obtain written approval from Departmental Representative for tinting of painting materials.
.2 Use and add thinner in accordance with paint manufacturer's recommendations.
.1 Do not use kerosene or similar organic solvents to thin water-based paints.
.3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.
.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

.6 Gloss/sheen ratings:
.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

Gloss Level-Category	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish	Max. 5	Max. 10
Gloss Level 2 - Velvet	Max.10	10 to 35
Gloss Level 3 - Eggshell	10 to 25	10 to 35
Gloss Level 4 - Satin	20 to 35	min. 35
Gloss Level 5 - Semi-Gloss	35 to 70	
Gloss Level 6 - Gloss	70 to 85	
Gloss Level 7 - High Gloss	More than 85	

.2 Gloss level ratings of painted surfaces as directed by designer.

.7 Exterior painting: see drawings for locations of finishes.
.1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.
.1 EXT 5.1D - Alkyd eggshell finish.
.2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
.1 EXT 5.3B - Alkyd eggshell finish.
.3 Dimension Lumber: columns, beams, exposed joists, underside of decking, siding, fencing, etc.
.1 EXT 6.2B - Waterborne stain finish.
.2 EXT 6.2C - Alkyd eggshell finish.
.3 EXT 6.2L - Semi-transparent stain finish.
.4 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.
.1 EXT 6.3B - Alkyd eggshell.
.2 EXT 6.3C - Solid colour stain finish.
.3 EXT 6.3D - Semi-transparent stain finish.

.8 Interior painting: Paint interior surfaces in accordance with the following MPI Architectural Painting Specification Manual requirements.
.1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.
.1 INT 5.1E Alkyd eggshell finish.
.3 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
.1 INT 5.3C - Alkyd eggshell finish (over cementitious primer).
.4 Dressed Lumber: doors, door and window frames, casings, mouldings, etc.:
.1 INT 6.3A - Latex eggshell finish.
.2 INT 6.3E - Polyurethane varnish eggshell finish.

PART 3 - EXECUTION

3.1 GENERAL

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

.2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection of in-place conditions:
.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.

.2 Surface Preparation:
.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
.4 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.

.3 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.4 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

.7 Touch up of shop primers with primer as specified.

3.4 APPLICATION

.1 Paint only after prepared surfaces have been accepted.

.2 Conform to manufacturer's application recommendations.

.3 Apply 1 coat of primer and two coats of paint in continuous film of uniform thickness.

.1 Repaint thin spots or bare areas before next coat of paint is applied.

.4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.5 Sand and dust between coats to remove visible defects.

.6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.7 Finish closets and alcoves as specified for adjoining rooms.

.8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

.9 Mechanical/Electrical Equipment:

.1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.

.2 Do not paint over nameplates.
.3 Paint propane gas piping [yellow].

3.5 CLEANING

.1 Progress Cleaning: leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling.

.4 Place paint, stains, an primers defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
- .1 ASTM A123/A123M-[13], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip. Withdrawn 2014, no replacement.
- .3 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A924/A924M-14, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .5 ASTM B456-[11e1], Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

.2 Canada Green Building Council (CaGBC)

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.81-[M90], Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
- .2 CAN/CGSB-1.88-[92], Gloss Alkyd Enamel, Air Drying and Baking.
- .3 CGSB 31-GP-107MA-[90], Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.

.4 CSA International
- .1 CSA B651-12, Accessible Design for the Built Environment.

.5 National Building Code (NBC) 2015.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product Data:
- .1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submit shop drawings and or catalogue cuts for the products specified.
- .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

.4 Sustainable Standards Certification:
.1 Low-Emitting Materials: submit listing of materials and adhesives verifying that they contain no urea-formaldehyde.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00.

1.4 MAINTENANCE MATERIAL SUBMITTALS

.1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00.
.2 Deliver special tools to Departmental Representative.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 toilet and bathroom accessories from nicks, scratches, and blemishes].
.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials in accordance with Section 01 74 20.

.1 Prepare Construction Waste Management plan in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Sheet steel: to ASTM A653/A653M with ZF001 designation zinc coating, minimum 30% recycled content.

SPEC NOTE: Usually stainless steel type 302 or 304 is satisfactory and both are acceptable. Use finish designations as recommended in ASTM A480.

.2 Stainless steel sheet metal: to ASTM A167, Type 302, with satin finish, minimum 75% recycled content.

.3 Sustainability Characteristics:
.1 Laminate Adhesives.

.1 Urea Formaldehyde Free.

.4 Stainless steel tubing: Type 302, commercial grade, seamless welded, 1.2 mm wall thickness, minimum 75% recycled content.

.5 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 COMPONENTS

2.3 FABRICATION

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

.3 Brake form sheet metal work with [1.5] mm radius bends.

.4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.5 Back paint components where contact is made with building finishes to prevent electrolysis.

.6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to ASTM A123/A123M.

.7 Shop assemble components and package complete with anchors and fittings.

.8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.

.9 Provide steel anchor plates and components for installation on studding and building framing.

2.4 FINISHES

.1 Chrome and nickel plating: to ASTM B456, satin finish.

.2 Manufacturer's or brand names on face of units not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrates and surfaces to receive toilet and bathroom accessories previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to toilet and bathroom accessories installation.

3.2 INSTALLATION

.1 Install and secure accessories rigidly in place as follows:
.1 Stud walls: install steel back-plate to stud prior to wall finishes. Provide plate with threaded studs or plugs.

.2 Use tamper proof screws/bolts for fasteners.

.4 Fill units with necessary supplies shortly before final acceptance of building.

3.3 ADJUSTING

.1 Adjust toilet and bathroom accessories components and systems for correct function and operation in accordance with manufacturer's written instructions.

.2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
.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.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling materials from site and dispose of materials at appropriate facility.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by toilet and bathroom accessories installation.