

Part 1 GENERAL

1.1 RELATED WORK

- .1 Section 01 47 15 - LEED Sustainable Requirements
- .2 Section 03 30 00 – Cast-in-place Concrete
- .3 Section 05 30 00 – Acoustic Metal Deck
- .4 Section 05 31 00 – Metal Deck
- .5 Section 05 50 00 - Metal Fabrications
- .6 Section 09 90 00 - Painting

1.2 QUALITY ASSURANCE

- .1 Fabricator and erector: A firm specializing in the fabrication of structural steel in accordance with CAN3-S16.1M, latest edition, with documented experience.
- .2 Welder: a firm specializing in the welding of structural steel components in accordance with CSA W47.1M, CSA W55.3, and CSA W59 (latest editions) with documented experience.
- .3 Design structural Work under the direct supervision of a Professional Engineer experienced in Work of this Section and registered in the Province of the Work.
- .4 Submit 3 certified copies of material mill reports upon Contract Administrator's request.
- .5 Comply with Canadian Institute of Steel (CISC) Code of Standard Practice, latest edition.
- .6 Where structural steel members are intended to be exposed, the appearance, surface preparation, and integration of Architectural Exposed Structural Steel (AESS) shall apply.

1.3 AESS CATEGORIES (CISC AESS Guide, Table 1)

- .1 AESS 2, Feature Elements Viewed at a Distance >6m (20'): Good fabrication practices with enhanced workmanship. Straightness tolerance is ½ the standard camber and sweep tolerance. Quality surface delivered by mills is acceptable. Welds to be smooth and uniform. HSS seams are acceptable as produced. Locations: Interior Open web steel joists, girts, beams, and structure at Splash pad area.
- .2 AESS 3, Feature Elements Viewed at a Distance <6m (20') and subject to touching: Good fabrication practices with more enhanced workmanship. Welds are generally smooth but visible, minor grind marks are acceptable. Matching of abutting cross-sections in rolled shapes are required and straightness tolerance is ½ the standard camber and sweep tolerance. Quality surface delivered by mills is acceptable. Welds to be ground smooth/filled. HSS seams to be oriented away from view. Locations: Exterior columns & beams at entry and interior columns at Splash pad area.

1.4 SUBMITTALS

- .1 Submit shop drawings and product data to comply with Section 01 33 00.
- .2 Indicate on shop drawings: profiles, sizes, spacing, locations, connections, tolerances, attachments, fasteners, bolt types & finishes, cambers, loads, and finishes. Also indicate which members are considered as AESS members and their Category.
- .3 Structural steel shop drawings shall bear the signature and seal of a Professional Engineer registered in the Province of the Work.
- .4 Upon request, provide a sample of each AESS category specified to the Contract Administrator for review.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Structural Steel Members: CAN3-G40.20M and CAN3-G40.21M (latest edition). All rolled steel structural sections shall be G40.21-50W, unless otherwise noted on Structural drawings. Angles, channels and plates exposed to exterior OR to interior pool

- environment shall be hot-dipped galvanized. All other members shall be G40.21 44W, shop primed.
- .2 Structural H.S.S. Tubing to CAN3-G40.21M (latest edition), Grade 350 W, shop primed.
 - .3 Bolts, Nuts, and Washers to ASTM A325 (latest edition).
 - .4 Welding Materials to CSA W59-03 (latest edition) and type as required for materials being welded.
 - .5 Shop-applied primers to CAN/CGSB-85.10 (latest edition) for plain steel surfaces and CGSB 85-GP-16M (latest edition) for galvanized surfaces and to be compatible with AESS category, where applicable.
 - .6 All materials shall be new, unless noted otherwise. Unfinished, reused, or weathering steel may only be used upon review and approval by the Contract Administrator.
 - .7 Sustainability: Maximize recycled content in steel as per Section 01 47 15 Schedule A.

2.2 FABRICATION

- .1 Fabricate structural steel members in accordance with CAN3-S16.1 (latest edition).
- .2 Verify all shop drawing dimensions prior to commencing fabrication.
- .3 Design details and connections to requirements of CAN3-S16-1 or latest to resist forces, moments, and shears indicated on drawings.
- .4 Weld all shop connections as indicated on the drawings.
- .5 Accurately cut and mill column ends and bearing plates to assure full contact of bearing surfaces prior to welding.
- .6 Close and weatherproof all gaps, butt joints, and connections which will be exposed to the exterior (or to interior pool environment). Grind exposed welds flush with the surface of welded members.
- .7 Fabricate and shop assemble any AESS assemblies to the greatest extent possible. Locate field joints at concealed locations or as reviewed by the Contract Administrator.

2.3 SHOP PAINTING, GENERAL

- .1 Clean all members, remove loose mill scale, rust, oil, dirt and other foreign matter.
- .2 Pre-prime bolts, nuts, sharp edges and corners with one coat before applying a full coat of primer.
- .3 Apply one coat of compatible shop-applied primer to all surfaces, grey colour. Apply primer under cover on dry surfaces, only when surface and air temperatures are above 5 degrees C. Maintain dry conditions and 5 degrees C minimum temperature until primer is thoroughly dry. Spray or brush primer to a dry film thickness of 0.05mm minimum.
- .4 For AESS members: remove any grease or oil by solvent cleaning to SSPC-SP-1. Remove all weld spatter, silvers, and surface irregularities. Soften any sharp edges from flame cutting, grinding, and shearing. Clean AESS members to meet SSPC-SP 6 "Commercial Blast Cleaning" (sandblast or shotblast).
- .5 Refer to Section 09 90 00 for finish paint coatings.

Part 3 EXECUTION

3.1 EXAMINATION

- .1 Before starting erection, take field measurements and examine other work that may affect this work.
- .2 Notify the Contract Administrator of any conditions that prejudice proper installation of this Work.
- .3 Commencement of this Work implies acceptance of existing conditions.

3.2 DAMAGED MEMBERS

- .1 Repair to the approval of the Contract Administrator or replace members damaged during transit or erection, before securing in position.
- .2 Report serious bends, twists or other damage to the Contract Administrator immediately.

3.3 ERECTION

- .1 Erect structural steel in accordance with CSA S16.1 (latest edition) and drawings.
- .2 Do not field weld surfaces during rain unless under cover.
- .3 Do not weld at temperature below 5 degrees C.
- .4 Conform to the requirements of CSA W59-03 (latest edition) for minimum preheat and inter pass temperatures.
- .5 Make adequate provision for all erection loads, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of necessary permanent bracing.
- .6 Set column bases and other vertical members to design elevations.
- .7 Use only light drifting to draw parts together. Enlarge holes for bolted connections with reamers or twist drill only. Do not burn to form holes, enlarge holes or match unfair holes.
- .8 Erection errors shall not exceed requirements of CSA S16.1(latest edition).
- .9 Obtain Contract Administrator's written permission prior to field cutting or altering structural members.
- .10 After erection, field prime welds, nuts, bolts, washers and touch up all abrasions and damage to shop primed surfaces.
- .11 Use special care in unloading, handling, and erecting AESS members to avoid marking or distorting, or damaging their architectural appearance.
- .12 Refer to Section 09 90 00 for final finishes.

3.4 GROUTING

- .1 Grout underside of steel column base plates with non-shrinking grout to manufacturer's specifications and where indicated on drawings.

END OF SECTION

Part 1 GENERAL

1.1 RELATED WORK

- .1 Section 05 12 00 – Structural Steel
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 07 53 50 - Modified Bituminous Membrane Roofing
- .4 Section 09 90 00 – Painting
- .5 Mechanical Division
- .6 Electrical Division

1.2 REFERENCES

- .1 CAN3-G40.21M - Structural Quality Steels
- .2 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings
- .3 American Iron and Steel Institute (AISI) Specification for Design of Cold-formed Steel Structural Members, for section properties
- .4 Steel Deck Institute (SKI) for superimposed load and diaphragm shear capacities

1.3 QUALITY ASSURANCE

- .1 Design metal decking and supports to support loads indicated on drawings, under direct supervision of a Professional Structural Engineer experienced in design of Work of this Section and registered in the Province of the Work.
- .2 Deck manufacturer shall have been regularly engaged in the production of roof deck and ceiling systems with all of the required features for a period of at least ten (10) years.
- .3 Noise reduction coefficients (NRC) shall be verified by the result of sound absorption tests conducted in accordance with ASTM C423 and E795.
- .4 Submit independent test reports that demonstrate that acoustical elements are securely attached to prevent dislocation or blow out at wind gusts up to 100 miles per hour.
- .5 Submit accelerated corrosion test reports from a recognized laboratory that tests were conducted for 4000 hours minimum on the stage one primer and the intermediate Natacoat primer via a controlled humidity chamber at 100 deg. F, infused with approx. 5 times the chlorine or bromine concentration found in a typical indoor pool environment. Corrosion on the panel surface and in the perforations shall be less than 20%, with 0% blistering of the paint finish.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings, product data, and application instructions to comply with Section 01 33 00.
- .2 Indicate on shop drawings: deck type, decking plan and dimensions, deck profile gauge, section properties, load tables, diaphragm shear tables, supports, projections, openings, access/raceway panels, reinforcement, finishes, details, accessories, and NRC ratings.
- .3 Shop drawings shall bear the signature and seal of a Professional Structural Engineer registered in the Province of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Protect all materials from damage during delivery, storage and handling.
- .2 Elevate all material storage above grade, with slopes for drainage, and protect from weather in well-ventilated areas, at ambient temperatures not less than 7 deg. C (45 deg. F).

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: roof deck cold-formed from steel coils conforming to ASTM A653, structural quality, with a minimum yield strength of 40 ksi. The minimum uncoated thickness of the steel furnished shall not be less than 95% of the design thickness.
- .2 Before forming, steel coils shall have a hot-dip protective coating of zinc conforming to ASTM A9224, Class G90, as defined in ASTM A653.
- .3 Bearing Angles: CAN3-G40.21M steel.
- .4 Welding Materials: CSA W55.3 and CSA W59.
- .5 Touch-up Primer: zinc rich, organic, ready mixed to CAN/CGSEB-1.181-99 to Green Seal Standard GC-03.

2.2 DECK AND RELATED ACCESSORIES

- .1 Acoustic Steel Roof Deck system with perforated, uniform rows of holes for enhanced acoustic absorption and performance. Factory installed, sound absorbing insulation encapsulated in polyethylene bags within the cellular space between the top flange and the cover plate, supported on corrosion resistant mesh spacers, to provide a minimum overall total NRC value of 0.95 minimum (value established by sound absorption tests without fiberglass insulation above the panels). Acceptable products: 'Envista F4.5A' by Epic Metals Corporation (Tel: 1.970.901.0966, email: dmills@epicmetals.com), OR 'Deep-Dek 4.5' by Metal Dek Group (dist. by New Millenium Building Systems, Tel: 1.260.868.6025, email: kdsinger@newmill.com). Locations: Pool/Spray Pad area and where indicated on the drawings.
- .2 Refer to Structural drawings for deck loading, spans, gauge, depth, and opening reinforcement, etc.
- .3 Accessories: Include standard sump pans, ridge plates, valley plates, eave plates, transition plates, closures, and reinforcement for small openings, as indicated on the drawings and as required for a complete installation.
- .4 For fire rated closures above fire rated walls, refer to Fire stopping Section, as applicable.
- .5 Where roof deck panels meet exterior walls, and/or continue from interior through to building exterior, provide neoprene air dams to accurately fit within deck flutes, to minimize the movement of conditioned air from interior to exterior. Air dams from below deck to be factory installed and air dams from above deck to be field installed.

2.3 FABRICATION

- .1 Before fabrication of panels, all surfaces of the galvanized sheet steel shall be processed through a continuous coil coating line, designed to degrease and clean the metal, followed by a chemical conversion coating to etch the surface for proper bond characteristics. Factory apply a stage one primer that is compatible with the intermediate epoxy primer, immediately after the chemical conversion process.
- .2 After fabrication or assembly of the panel, factory prime exposed surfaces and inside periphery of perforations with an epoxy primer base coat ('Natacoat' by Epic Metals, 'Versa-Shield G' by Metal Dek Group). This primer shall be oven-cured to enhance adhesion and durability characteristics.
- .3 Fabricate deck sections by the continuous cold-roll forming process with connections of the bottom plate to the panel to be concealed.
- .4 Decking shall have interlocking and vertically self-aligning side laps that present a flush appearance with tight-fitting joints from the interior.
- .5 Decking shall have roll-formed embossments located between the longitudinal stiffening ribs in the top flanges and horizontal stiffening ribs along the vertical webs to enhance the structural performance.

- .6 Shallow stiffening ribs shall be roll-formed into the bottom plates. The ribs shall be located in the area between the webs to enhance flatness of the bottom plate.
- .7 Finish top coat: Site painted by Section 09 90 00 for Envista F4.5A, OR factory-applied 'Versa-Shield 10' for 'Deep-Dek 4.5' by Metal Dek Group..

PART 3 EXECUTION

3.1 GENERAL PREPARATION

- .1 Install material of this Section in strict accordance with the manufacturer's written instructions, approved erection drawings, and all applicable safety regulations.
- .2 Examine supporting structural frame and other Work on site to determine that existing conditions are ready for Work of this Section.
- .3 Locate bundles of material of this Section on the supporting frame in such a manner that any framing members are not overloaded.

3.2 INSTALLATION

- .1 Erect metal decking to CSSBI standards and welding to CSA W55.3.
- .2 Place decking on supporting structural frame and adjust to final position with ends accurately aligned and adequately bearing on supporting frame. Maintain consistent coverage so panels in adjacent bays are properly aligned.
- .3 On steel support members provide 38mm (1 ½") minimum bearing.
- .4 On masonry support surfaces provide 100mm (4") minimum bearing.
- .5 Mechanically fasten male/female side laps at 300 mm o.c. maximum. Refer to Structural drawings for dimensions.
- .6 Fasten deck to supporting structural members with powder actuated Hilti-type pins to prevent the burning away of coatings associated with welding. If welding is required, use two 19 (3/4") diameter puddle welds per 450 (18') wide panels or as indicated on the manufacturer's erection drawings. Apply a rust prohibitive aerosol paint over all welds.
- .7 Decking side laps shall be fastened together with 38 (1 ½") long seam welds, or No. 12 stainless steel screws at a maximum spacing of 300 (12") o.c., as indicated on manufacturer's erection drawings (for tight side laps in pool applications).
- .8 Cut decking to suit drawings and jobsite conditions in a neat and profession manner. Reinforce openings up to 450mm in any dimension in deck with 75 x 75 x 6 mm steel angles, set perpendicular to ribs; extend at least two flutes each side of opening and weld to deck.
- .9 Construction loads shall not be applied to roof deck until after panels are permanently fastened to structural members and shall not exceed the capacity of the panels.
- .10 Install sheet steel closures and angle flashing to close openings between deck and walls, columns, and openings.
- .11 Ceilings, light fixtures, baffles, conduit, pipe, and ductwork shall not be suspended from the roof deck without approval from the Contract Administrator.
- .12 Immediately after any welding, wire brush, clean, and touch-up all welds, burned areas, and damaged surface coating areas and recoat with a rust prohibitive aerosol touch-up primer.
- .13 Clean exposed surfaces of all decking in preparation for site painting; refer to Section 09 90 00. Take special care that spray paint coating does not block any acoustic perforations.

3.3 COORDINATION WITH ROOFING

- .1 Fasteners for roofing material and thermal insulation shall only be attached **to the top of the hat section of this decking, with screws a maximum 38 (1 ½") longer than the depth of the material being attached. Screws or other attachments shall NOT penetrate through the exposed bottom flat deck portion.**

END OF SECTION

Part 1 GENERAL

1.1 RELATED WORK

- .1 Section 05 12 00 – Structural Steel
- .2 Section 05 30 00 – Acoustic Metal Deck
- .3 Section 05 50 00 – Metal Fabrications
- .4 Section 07 53 50 - Modified Bituminous Membrane Roofing
- .5 Section 09 90 00 - Painting

1.2 REFERENCES

- .1 CAN3-G40.21M - Structural Quality Steels.
- .2 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

1.3 QUALITY ASSURANCE

- .1 Design metal decking and supports to support loads indicated on drawings, under direct supervision of a Professional Structural Engineer experienced in design of Work of this Section and registered in the Province of the Work.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings and product data to requirements of Section 01 33 00.
- .2 Indicate on shop drawings: deck type, decking plan, deck profile gauge, dimensions, supports, projections, openings, reinforcement, finishes, pertinent details, and accessories.
- .1 Shop drawings shall bear the signature and seal of a Professional Structural Engineer registered in the Province of the Work.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: ASTM A525, Grade A structural quality; hot-dip galvanized to Z275 for floor deck and ZF075 wiped zinc coat designation for roof deck.
- .2 Bearing Angles: CAN3-G40.21M steel.
- .3 Welding Materials: CSA W55.3 and CSA W59.
- .4 Touch-up Primer: zinc rich, organic, ready mixed to CAN/CGSEB-1.181-99 to Green Seal Standard GC-03.

2.2 DECK AND RELATED ACCESSORIES

- .1 Metal Roof Decking: minimum 0.76 mm thick sheet steel, 38mm high \pm 1mm, fluted profile to CSSBI - Standard for Metal Roof Deck; 914 mm wide sheets \pm 2mm; multiple span, non-cellular, interlocking side laps.
- .2 Metal Floor Decking: minimum 0.76 mm thick sheet steel, 38mm high \pm 1mm, fluted profile to CSSBI - Standard for composite Floor Deck; 914 mm wide sheets \pm 2mm; multiple span, non-cellular, interlocking side laps.
- .3 Acoustic Metal Roof Decking: refer to Section 05 30 00.
- .4 Closure strips, Flashing, Cover Plates: minimum 0.76mm thick base sheet steel, Z275 zinc coating, or required profiles and sizes.
- .5 Insulation Metal Deck Flute Fillers: rigid mineral wool fiber insulation, 200 kg/m³ (12.5 lb/ft³) density, water absorption <1 %, CFC and HCFC free, custom cut to fit snugly into deck flutes. Acceptable products: Roxul Protec Metal Deck Flute Filler by ModulR TS. Locations: at all acoustic roof deck areas for full coverage, and where exterior walls and interior sound rated

walls/partitions meet the underside of any metal roof decking. Also refer to Reflected Ceiling Plan and Floor Plan drawings for locations.

- .6 For fire rated closures above fire rated walls, refer to specified Firestopping Sections, if applicable.

2.3 FABRICATION

- .1 Fabricate deck sections to CSA S136-07, Canadian Sheet Steel Building Institute (CSSBI) and to dimensions indicated on drawings.
- .2 Provide a male and female lip for each section of steel deck.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Erect metal decking in accordance with CSSBI standards. Provide welding in accordance with CSA W55.3.
- .2 On steel support members provide 38mm (1 ½") minimum bearing.
- .3 On masonry support surfaces provide 100mm (4") minimum bearing.
- .4 Mechanically fasten male/female side laps at 300 mm o.c. maximum. Refer to Structural drawings for dimensions.
- .5 Fasten deck to steel support members at ends and intermediate supports with 19mm fusion welds at 300mm o.c. maximum. Longitudinal weld spacing shall not exceed 1200 mm o.c.. Refer to Structural drawings for dimensions.
- .6 Reinforce openings up to 450mm in any dimension in deck with 75 x 75 x 6 mm steel angles, set perpendicular to ribs; extend a minimum of two flutes each side of opening and weld to deck.
- .7 Install decking according to design sheet widths and depths and locate all end joists over support. Lap all end joints on non-cellular deck 50mm (2") minimum.
- .8 Install 150 mm wide sheet steel cover plates where deck changes direction and spot-weld in place at 300 mm o.c. maximum.
- .9 Install sheet steel closures and angle flashing to close openings between deck and walls, columns, and openings.
- .10 Immediately after welding deck in place, wire brush, clean, and touch-up welds, burned areas, and surface coating damaged, with touch-up primer.
- .11 Supply insulation flute fillers for installation by the Roofing Trade, prior to roofing, unless specified otherwise.
- .12 Coordinate supply of acoustic neoprene closures in a timely manner, for installation by other trades, for all junctions of steel deck to sound insulated walls.
- .13 Where acoustic deck is scheduled, fit acoustic insulation neatly to fill the deck flutes from above, and any gaps between wall and roof assemblies.
- .14 Fit foam cell closures neatly into deck flutes at all locations directly where steel decking meets sound rated walls and partitions typically, and where indicated on the drawings.
- .15 Where acoustic deck is scheduled to be site painted as per Section 09 90 00, care shall be taken to spray paint so the paint finish does not block any of the deck perforations.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and application of Wind-Load bearing steel stud systems.
- .2 Related Sections:
 - .1 Section 01 47 15 – LEED Sustainable Requirements
 - .2 Section 01 74 21- Construction/Demolition Waste Management and Disposal
 - .3 Section 05 12 00 – Structural Steel
 - .4 Section 07 21 13 – Board Insulation
 - .5 Section 07 25 00 – Vapour and Air Barrier
 - .6 Section 09 29 00 – Gypsum Board

1.2 REFERENCES (latest editions)

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .2 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
 - .3 CSA W55.3-1965, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .4 CSA W59-03, Welded Steel Construction (Metal Arc Welding) (Metric Version).
 - .5 CAN/CSA S136, North American Specification for the Design of Cold-Formed Steel Structural Members.
- .4 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI 50M, Lightweight Steel Framing Manual.
 - .2 CSSBI 52M, Lightweight Steel Framing Binder.
 - .3 CSSBI Fact Sheet #3, Care and Maintenance of Prefinished Sheet Steel Building Products.
 - .4 CSSBI Technical Bulletin Vol. 7, No. 2, Changing Standard Thicknesses for Canadian Lightweight Steel Framing Applications.
 - .5 CSSBI S5, Guide Specification for Wind Bearing Steel Studs.
- .5 The Master Painters Institute (MPI) / Architectural Painting Specification Manual
 - .1 MPI # 18, Organic Zinc Rich Primer.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.

- .2 Co-ordinate submittal requirements and provide submittals required by Section 01 47 15.
 - .3 Shop Drawings:
 - .1 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.
 - .2 Indicate locations, dimensions, openings and requirements of related work.
 - .3 Indicate welds by welding symbols as defined in CSA W59.
 - .4 Confirm compliance of shop drawings with all loads required in applicable Building Codes; shop drawings to be sealed by a Professional Engineer, who is registered in the province of the Work.
 - .4 Submit samples of framing components and fasteners to Contract Administrator.
 - .5 Upon request, submit two certified copies of mill reports covering material properties.
 - .6 Upon request, submit manufacturer's written report within 3 days of review, verifying compliance of Work, as described in PART 3.
- 1.4 QUALITY ASSURANCE
- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 30.
- 1.5 DELIVERY, STORAGE AND HANDLING
- .1 Protect steel studs during transportation, site storage and installation in accordance with CSSBI Sheet Steel Facts #3.
 - .2 Handle and protect galvanized materials from damage to zinc coating.
 - .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.
 - .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 Ensure emptied containers are sealed and stored safely.
 - .5 Divert unused metal materials from landfill to metal recycling facility as approved by Contract Administrator.
 - .6 Fold up metal and plastic banding, flatten and place in designated area for recycling.
- Part 2 PRODUCTS**
- 2.1 MATERIALS
- .1 Steel: to CSA S136, fabricated from ASTM A653/A653M, Grade [230] [340] steel.
 - .2 Zinc coated steel sheet for all Work exposed to exterior OR exposed to indoor pool environment: quality to ASTM A653/A653M, with [Z180] [Z275] designation coating.

- .3 Aluminum-zinc alloy coated steel sheet: quality to ASTM A792/A792M, with [AZM150] [AZM180] designation coating.
- .4 Welding materials: to CSAW59 and certified by Canadian Welding Bureau.
- .5 Screws: pan head, self-tapping sheet metal screws, galvanized, corrosion protected with minimum zinc coating thickness of 0.008 mm.
- .6 Anchors: concrete expansion anchors or other suitable drilled-type galvanized fasteners.
- .7 Bolts, nuts, washers: hot dipped galvanized to CAN/CSA-G164, 600 g/m² zinc coating.
- .8 Touch up primer: zinc rich, to CAN/CGSB 1-GP-181 and MPI #18.

2.2 STEEL STUD DESIGNATIONS

- .1 Colour code: to CSSBI Technical Bulletin Vol.7, No. 2.

2.3 METAL FRAMING

- .1 Steel studs/z-girts: to CSA S136, fabricated from zinc-coated steel, depth as indicated on drawings and details.
 - .1 Minimum steel thickness of 1.31mm (18-gauge).
- .2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit.
 - .1 Bottom track: single piece.
 - .2 Top track: single piece with extended legs and deflections slots, to allow for deflection/expansion/contraction of framing and to prevent premature cracking of finishes.
- .3 Bridging: fabricated from same material and finish as studs, 38 x 12 x 1.09 mm minimum thickness.
- .4 Angle clips: fabricated from same material and finish as studs, 38 x 38 mm x depth of steel stud x 1.31mm (18-gauge) minimum.
- .5 Tension straps and accessories: as recommended by manufacturer.

Part 3 EXECUTION

3.1 GENERAL

- .1 Do welding in accordance with CSA W59.
- .2 Certification of companies: CSA W47.1 for fusion welding and CSA W55.3 for resistance welding.
- .3 Do work to CSSBI S5.

3.2 ERECTION

- .1 Erect components to requirements of reviewed shop drawings.
- .2 Anchor tracks securely to structure at 800mm on centre maximum, unless lesser spacing prescribed on shop drawings.

- .3 Erect studs plumb, aligned and securely attached with two screws minimum, welded in accordance with manufacturer's recommendations.
- .4 Extend steel stud framing to underside of structure typically, unless noted or indicated otherwise on drawings.
- .5 Install deflection track at top of walls where required to accommodate vertical deflection. Seat studs into bottom tracks and top tracks, allowing for an overlap. Do not fasten tracks together but stagger joints.
- .6 Install studs at not more than 50mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.
- .7 Brace steel studs with horizontal internal bridging. Fasten bridging to steel clips fastened to steel studs with screws or by welding.
- .8 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.
- .9 Touch up welds with coat of zinc rich primer.

3.3 ERECTION TOLERANCES

- .1 Plumb: not to exceed 1/500th of member length.
- .2 Camber: not to exceed 1/1000th of member length.
- .3 Spacing: not more than +/- 3.0 mm from design spacing.
- .4 Gap between end of stud and track web: not more than 4.0 mm.

3.4 CUTOUTS

- .1 Maximum size of cutouts for services as follows:

Member Depth	Across Member Depth	Along Member Length	Centre to Centre Spacing (mm)
92	40 max.	105 max.	600 min.
102	40 max.	105 max.	600 min.
152	65 max.	115 max.	600 min.

- .2 Limit distance from centerline of last unreinforced cutout to end of member to less than 300 mm.

3.5 FIELD QUALITY CONTROL

- .1 Verify requirements in accordance with Section 01 47 15:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Local/regional materials.
 - .5 Low-emitting materials.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete
- .2 Section 09 90 00 – Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM), latest edition.
 - .1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - .2 ASTM A276, Standard Specification for Stainless Steel Bars and Shapes
 - .3 ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .4 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- .2 Canadian General Standards Board (CGSB), latest edition
 - .1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB-1.108-M, Bituminous Solvent Type Paint
 - .3 CAN/CGSB-1.181, Ready-Mixed, Organic Zinc-Rich Coating
- .3 Canadian Standards Association (CSA), latest edition
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel
 - .2 CAN/CSA-G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles
 - .3 CAN/CSA-S16.1, Limit States Design of Steel Structures
 - .4 CSA W48.1-M, Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
 - .5 CSA W48.2-M, Chromium-Nickel Steel Covered Electrodes for Shielded
 - .6 CSA W48.3-M, Low Alloy Steel Covered Electrodes for Shielded Metal Arc Welding
 - .7 CSA W48.4, Solid Carbon Steel Filler Metals for Gas Shielded Arc Welding
 - .8 CSA W48.5-M, Carbon Steel Electrodes for Flux- and Metal-Cored Arc Welding
 - .9 CSA W48.6, Fluxes and Carbon Steel Electrodes for Submerged Arc Welding
 - .10 CSA W59-M, Welded Steel Construction (Metal Arc Welding)

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- .2 **Miscellaneous steel shop drawings for Work of this Section shall meet all applicable codes and regulations and shall bear the signature and seal of a Professional Engineer registered in the same province as the Work.**

1.4 PROTECTION

- .1 Deliver, store, handle and protect materials in accordance with Section 01 60 00.
- .2 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or strippable plastic coating, before shipping to Site. Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WARRANTY

- .1 Provide a one (1) year written warranty for Work of this Section against all defects in materials, fabrication, installation, and workmanship, from the Date of Substantial Performance.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections, bars, rods, and plates: to CAN/CSA-G40.20/G40.21, Grade 350 W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, black finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- .7 Galvanizing: to CSA G164-M92, hot dipped galvanizing, minimum zinc coating 600 g/m² (2 oz/sq. ft.) for all exterior components typically and where noted.

2.2 MISCELLANEOUS STEEL SECTIONS

- .1 Supply all miscellaneous steel angles, plates, brackets, lintels, bars, rods, etc., as indicated and noted on the drawings or as specified. Size to suit required loads. Continuously weld and grind smooth exposed connections. Also refer to drawings for connections and details.

2.3 FABRICATION

- .1 Fabricate Work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Weld all connections typically, unless noted otherwise. Ensure that exposed welds are continuous for length of each joint. File or grind smooth any exposed welds, flush to adjacent surfaces, and free of any burrs, sharp filings, or protrusions. Make exposed joints tight and flush. Ease exposed edges to form a small, uniform radius.
- .4 Where applicable for interior work only, typically countersink any exposed screws or bolts, of matching colour and material to the surface, unless otherwise noted. Use self-tapping, shake-proof, round-headed screws on items requiring assembly.
- .5 Tolerances:
 - .1 Squareness: 3mm (1/8") maximum difference in diagonal measurements.
 - .2 Maximum Offset Between Faces: 1.6mm (1/16").
 - .3 Maximum Misalignment of Adjacent Members: 1.6mm (1/16").
 - .4 Maximum Bow: 3 in 1200mm (1/8" in 4').
 - .5 Maximum Deviation from Plane: 1.6mm in 1200mm (1/16" in 4').

2.4 FINISHING

- .1 Clean all surfaces of rust, scale, grease, and foreign matter, prior to finishing.
- .2 Whenever possible, shop apply coatings before assembly. If size permits, galvanize components after assembly, in accordance with requirements of CSA Standard G164-M.
- .3 Do not prime surfaces in direct contact bond with concrete or where field welding is required.

- .4 Prepare surfaces to be clean, dry, and free of rust, scale, and grease. Use products specified in Section 099000 (primer colour grey). Do not paint when temperature is lower than 7°C.
- 2.5 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.
- 2.6 STEEL ACCESS LADDERS
 - .1 Construct access ladders as detailed and to comply with all applicable codes and regulations and shop weld connections where possible.
 - .2 Unless detailed otherwise, access ladders shall typically be constructed of 10 x 50 flat steel bar posts each side. Extend posts to within 75 (3") of underside of hatch or access point and return posts toward wall at top. Extend ladder above access from top of hatch or access point and extending 900 above finished floor and return posts toward wall at top. Leave a clear dimension of 510mm (20") between vertical posts and construct ladder rungs of 19 (3/4") diameter rebar, spaced no more than 300 (12") o.c. maximum vertically. Leave a clear dimension of 180 (7") between the posts and the finished wall surface and weld posts to 10 x 50 steel bracket angles at 1200 o.c. maximum vertically, for secure anchoring into the wall substrate.
 - .3 Unless detailed otherwise, where access ladders occur in areas accessible to the public, provide a 6 (1/4") thick steel plate cover to fit over the ladder, starting from 300mm AFF to 2100mm AFF, with continuous piano hinges on one side and a slot through the cover and a hasp welded to the vertical bar post on the other side (future padlock by The City).
 - .4 Permanently fix access ladders to building structure and meet all applicable codes/regulations, including ANSI A14.3-2008. Where total ladder height exceeds 3300 (11'), provide a steel protection cage on the upper portion of the ladder, starting at 2440 (8') above the finished bottom level. This safety cage shall have steel banding with a minimum 762 (30") inside clear diameter (measured from the centre of the rung). Space banding at 1220 (48") o.c. maximum horizontally and at 230 (9") o.c. maximum vertically.
 - .6 Steel components for all exterior and interior roof access ladders, to be **hot-dipped galvanized typically**.
- 2.7 STEEL RAILINGS AND GUARDS
 - .1 Supply and install railings as indicated on drawings and details, and as required in compliance with all current Building Code requirements.
 - .2 Railings shall be plumb, true, rigid, and of 38 to 42mm diameter standard stainless steel pipe, unless otherwise noted. Include any related steel rods, flat bars, and other shapes and sizes as indicated on the drawings in same finish. Typically, close the ends of all pipes, tubes, joints, and intersecting members; weld and ground smooth all joints. Set handrails typically at 900mm above stair/ramp surfaces and guardrails at 1070mm above landing areas. Weld free-standing horizontal railings to 42mm dia. steel posts at spacing indicated on the drawings (1500mm maximum o.c.). Extend handrails minimum 300mm horizontally (@ 900mm height above landings) past the top & bottom landing edge. At free-standing locations, terminate handrails in a smooth, curved shape back to the nearest vertical post. At wall-mounted locations, weld handrails to a 16mm dia. curved bar and a 100mm dia. steel wall plate, secured into the wall structure @ 1500mm o.c. maximum with lag bolts or screws. Make railings continuous and extend horizontally at top and bottom landing edges similarly, as required by Code. At wall-mounted locations, terminate handrail by curving and returning back towards the wall, leaving a 6mm (1/4") gap to the wall surface. Bends in railings shall have a 75mm (3") outer radius minimum.

- .3 **All components, fittings, and fasteners for new interior guardrails & handrails to be of Type #316 stainless steel typically**, to ASTM A276. Railing at new Entry Lobby 101 to have a removable section 1220mm (48") wide, for emergency use only; provide railing posts in this section that fit into floor sockets, removable with a special tool only.
 - .4 **All components, fittings, and fasteners for new exterior entry stair guardrails & handrails to be hot dipped galvanized steel typically.**
 - .5 Shop drawings shall be provided by the steel supplier and sealed by a registered Structural Engineer licensed to practice in Manitoba. Guardrails, handrails, and related elements (including any rails, pickets, & panels) as a complete system, shall be stated on shop drawings to meet all load requirements as required by all applicable Building Codes and regulations.
 - .6 Railing members shall be positively and securely attached to building structure. Weld all connections where possible or use bolted connections, of same material, where welding is not feasible. Cut extra bolt lengths off flush with nuts cleanly. The method of construction and assembly is up to the fabricator, but shall be in accordance with the best standard practices and shall meet with the Contract Administrator's approval.
 - .7 Railings shall be plumb, true, rigid, and of 42mm diameter standard steel pipe, unless otherwise noted. Include any related steel rods, flat bars, and other shapes and sizes as indicated on the drawings. Typically, close the ends of all pipes, tubes, joints, and intersecting members; weld and ground smooth all joints. Unless otherwise noted on drawings, set handrails typically at 900mm above stair nosings and guardrails at 1070mm above finished floors. Weld free-standing horizontal railings to 42mm dia. steel posts at spacing indicated on the drawings (1500mm maximum o.c.). Extend handrails minimum 300mm horizontally (@ 900mm height above landings) past the top & bottom landing edge. At free-standing locations, terminate handrails in a smooth, curved shape back to the nearest vertical post. At wall-mounted locations, weld handrails to a 16mm dia. curved bar and a 100mm dia. steel wall plate, secured into the wall structure @ 1500mm o.c. maximum with lag bolts or screws. Make railings continuous and extend horizontally at top and bottom landing edges similarly, as required by Code. At wall-mounted locations typically, terminate handrail by curving and returning it back towards the wall, leaving a 6mm (1/4") gap to the wall surface. Bends in railings shall have a 75mm (3") outer radius minimum. Cap ends with the same diameter steel plate to match and weld.
 - .8 Refer to Section 09 90 00, for a site-applied protective finish coats.
- 2.8 MASONRY OPENING LINTELS
- .1 Provide lintels as indicated on Structural drawings and notes.
 - .2 Typically, provide hot-dipped galvanized steel loose lintels at exterior openings and prime painted at interior openings.
 - .3 Provide lintels where indicated for new openings including windows, doors, ductwork, etc.
 - .4 Provide a minimum 150mm (6") minimum bearing at each end.
- 2.9 MASONRY SUPPORT SHELF ANGLES
- .1 Provide a continuous hot dip galvanized steel angles to support any exterior masonry veneer walls, as shown on drawings.
- 2.10 LATERAL SUPPORT FOR MASONRY
- .1 Provide deflection and lateral support angles for non-loadbearing masonry walls as detailed on Structural Drawings.
- 2.11 MISCELLANEOUS ITEMS, STEEL BRACKETS, SUPPORTS AND ANGLES
- .1 Supply all related steel HSS, brackets, supports, and angles as indicated on the drawings and details. Pre-drill for countersunk screws and anchor bolts.
 - .2 Unless noted otherwise, finishes shall be stainless steel noted to be Type #316, OR hot-dipped galvanized finish, at minimum where not noted to be stainless.
 - .3 Neoprene washers to separate different types of metals.

- 2.12 BOLLARDS
 - .1 Galvanized steel pipe to sizes and depths as shown on drawings.
- 2.13 SUMP PIT COVER
 - .1 Galvanized steel cover.
- 2.14 GRATING COVERS
 - .1 Standard steel welded bar grating, 32 x 5mm thick, with saddle clips and 50 x50 x 5mm thick continuous perimeter steel ledge angle. Typical finish to be hot dipped galvanized. Refer to drawings for sizes, details, and locations.

PART 3 EXECUTION

3.1 ERECTION

- .1 Perform welding Work in accordance with CSA W59, unless specified otherwise.
- .2 Erect metal Work square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles, as required to secure the Work.
- .4 Exposed fasteners shall match finish and be compatible with adjacent material through which they pass.
- .5 Supply components for building into Work by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Cut off all sharp edges, corners, burrs, etc. and grind smooth before shop priming.
- .9 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .10 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- .11 Provide neoprene washers to separate where different types of metals meet.

3.2 CLEANING

- .1 As Work progresses, keep installed materials clean and leave areas clean at the end of each day.
- .3 Final Cleaning: upon completion, remove all surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00.

3.3 PROTECTION

- .1 Protect installed Work and components from damage during construction.
- .2 Repair damage to any adjacent materials caused by Work of this Section.

END OF SECTION