Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 21 00 – Steel Joist Framing.

.2 Section 05 31 00 – Steel Decking.

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

1.2 REFERENCES

.1 ASTM International Inc.

- .1 ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel.
- .2 ASTM A193/A193M-08, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
- .3 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .5 ASTM A325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric).
- .6 ASTM A490M-04ae, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).

.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 2-75, Quick-Drying, Primer for Use on Structural Steel.
- .2 CISC/CPMA 1-73a, Quick-Drying, One-Coat Paint for Use on Structural Steel.

.4 Canadian Standards Association (CSA International)

- .1 CSA G40.20/G40.21-09, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.
- .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
- .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
- .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
- .7 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.5 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International

- .1 SSPC SP-2, SP-7.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

- .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.3 Erection drawings:

.1 Submit erection drawings indicating 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.

.4 Fabrication drawings:

.1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Manitoba, Canada.

.5 Samples :

.1 Upon request, prepare sample of typical exposed structural connections in accordance with AISC Specifications of Architecturally exposed structural steel for approval of Contract Administrator. Samples to be judged upon alignment of surfaces, uniform contact between surfaces, smoothness and uniformity of finished welds. When approved, sample units will serve as a standard for workmanship, appearance and material acceptable for entire project.

.6 Source Quality Control Submittals:

.1 Submit 2 copies of mill test reports 4 weeks prior to fabrication of structural steel.

.1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.

.2 Provide mill test reports certified by metallurgists qualified to practice in Province of Manitoba, Canada.

.7 Fabricator Reports:

.1 Upon request, provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 with CSA-S136.1 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 For composite construction select or design minimum end connection to resist reaction resulting from factored movement resistance as tabulated in the "Handbook of the Canadian Institute of Steel Construction" assuming 100% shear connection with depth of steel deck and/or slab shown on drawings.

.4 Upon request, Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Manitoba, Canada for non standard connections.

2.2 MATERIALS

.1 Structural steel: All rolled or steel structural sections shall be G40.21-350W. All Hollow structural sections to be G40.21-350W class C. All angles, channels and plates shall be G40.21-300W.

.2 Anchor bolts: to CSA-G40.20/G40.21, Grade 300W.

.3 Bolts, nuts and washers: to ASTM A307, ASTM A325M, and ASTM A490/A490M as required.

.4 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.

.5 Shop paint primer:

.1 Steel not receiving finish painting: one coat of CISC/CPMA 1-73A quick drying shop primer

.2 Steel receiving finish painting: one coat of CISC/CPMA 2-75 quick drying shop primer.

.6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m^2.

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

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16, CAN/CSA-S136, 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.

2.4 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel as follows:

.1 Steel not receiving finish painting: One coat of CISC / CPMA 1-73a quick drying shop primer. Steel to be cleaned in conformance with SSPC-SP2.

.2 Steel receiving finish painting: One coat of CISC / CPMA 2-75 quick drying shop primer. Steel to be cleaned in conformance with SSPC-SP7.

.3 Exterior structural steel: All exterior structural steel shall be hot-dipped galvanized unless noted.

.2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter.

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

.1 Surfaces to be encased in concrete.

.2 Surfaces to receive field installed stud shear connections.

.3 Surfaces and edges to be field welded.

.4 Faying surfaces of slip-critical connections.

.5 Below grade surfaces in contact with soil.

.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 APPLICATION

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

3.2 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16, CAN/CSA-S136.

.2 Welding: in accordance with CSA W59.

.3 Companies to be certified under Division 1 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 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Contract Administrator for direction before commencing fabrication.

3.4 MARKING

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

.2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.5 ERECTION

.1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16, CAN/CSA-S136, and in accordance with reviewed erection drawings.

.2 Field cutting or altering structural members: to approval of Contract Administrator.

.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.

3.6 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Contract Administrator.

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

.3 Submit test reports to Contract Administrator within 2 weeks of completion of inspection.

.4 The City will pay costs of tests as specified in Section 01 21 00 – Allowances.

.5 Test shear studs in accordance with CSA W59.

3.7 FIELD PAINTING

.1 Paint in accordance with Section 09 91 10 - Painting.

.1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP7 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

3.8 CLEANING

.1 Clean in accordance with Section 01 74 00 – Project Clean-Up.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 05 12 23 – Structural Steel For Buildings.

.2 Section 05 31 00 - Steel Deck.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-85.10-99, Protective Coatings for Metals.

.2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)

.1 CISC/CPMA 2-75, Quick-Drying, Primer for Use on Structural Steel.

.2 CISC/CPMA 1-73a, Quick-Drying, One-Coat Paint for Use on Structural Steel.

.3 Canadian Standards Association (CSA International)

.1 CSA-G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.

.3 CSA-S136-07(R2001), Cold Formed Steel Structural Members.

.4 CSA-W47.1-92(R2001)-latest, Certification of Companies for Fusion Welding of Steel Structures.

.5 CSA-W55.3-1965(R1998)-latest, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.6 CSA-W59-03-latest, Welded Steel Construction (Metal Arc Welding).

1.3 QUALITY ASSURANCE

.1 Submit 2 copies of mill test reports at least 4 weeks prior to fabrication of steel joists and accessories. Reports to show:

.1 Chemical and physical properties.

.2 Other details of steel to be incorporated into work.

.3 Certification by qualified metallurgists confirming that tests conform to requirements of CSA G40.20/G40.21

.2 Upon request, supply affidavit prepared by fabricator of structural steel joists stating that materials and products used in fabrication conform to this specification.

1.4 DESIGN OF STEEL JOISTS AND BRIDGING

.1 Design steel joists and bridging to carry loads indicated on drawings in accordance with CAN/CSA-S16, CSA-S136.

.2 Design joists and anchorages for uplift forces as indicated.

.3 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.

.4 Limit floor and roof joist deflection due to specified live load to L/360 and deflection due to specified total load to L/240.

.5 Upon request, submit 2 copies of calculations and joist design drawings for typical joists for Contract Aministrator review at least 4 weeks prior to fabrication and/or delivery.

1.5 SHOP DRAWINGS

.1 Submit shop details and erection drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit drawings stamped and signed by qualified professional engineer registered in the province Manitoba, Canada.

.3 Indicate on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.

.4 Provide particulars, on shop drawings, relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.

Part 2 Products

2.1 MATERIALS

.1 Structural steel: to CSA-G40.20/G40.21 and CSA-S136.

.2 Welding materials: to CSA-W59.

.3 Shop paint primer:

.1 Steel not receiving finish painting: one coat of CISC/CPMA 1-73A quick drying shop primer

.4 Shear studs: to CSA-W59, Appendix H.

2.2 FABRICATION

.1 Fabricate steel joists and accessories as indicated in accordance with CAN/CSA-S16.1, CSA-S136, and in accordance with reviewed shop drawings.

.2 Weld in accordance with CSA-W59.

.3 Provide top and bottom chord extensions where indicated.

.4 Provide diagonal and horizontal bridgings and anchorages as required.

.5 Weld studs to top chords for attachment purposes.

.6 Install shear studs in accordance with CSA-W59.

2.3 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel as follows:

.1 Steel not receiving finish painting: One coat of CISC / CPMA 1-73a quick drying shop primer. Steel to be cleaned in conformance with SSPC-SP2.

.2 Clean members of loose mill scale, rust, oil, dirt and other foreign matter.

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

.1 Surfaces to be encased in concrete.
.2 Surfaces to receive field installed stud shear connections.
.3 Surfaces and edges to be field welded.
.4 Faying surfaces of slip-critical connections.
.5 Below grade surfaces in contact with soil.

.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 bolts, nuts, sharp edges and corners before prime coat is dry.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16, and CSA-S136.

.2 Welding: in accordance with CSA-W59.

.3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding and/or CSA-W55.3 for resistance welding.

.4 Provide certification that welded joints are qualified by Canadian Welding Bureau.

3.2 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work; report discrepancies and potential problem areas to Contract Aministrator for direction before commencing fabrication.

3.3 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Contract Aministrator.

.2 Testing laboratory will inspect representative joists for integrity, accuracy of fabrication and soundness of welds. Contract Aministrator will determine extent of and identify all inspections.

.3 Submit test report to Contract Aministrator 2 weeks after completion of inspection.

.4 The City will pay costs of tests as specified in Section 01 21 00 – Allowances.

.5 Test shear studs in accordance with CSA-W59.

3.4 ERECTION

.1 Erect steel joists and bridging as indicated in accordance with CAN/CSA-S16.1, CSA-S136, and in accordance with reviewed erection drawings.

.2 Complete installation of all bridging and anchorages before placing construction loads on joists.

.3 Field cutting or altering joists or bridging that are not shown on shop drawings: to be reviewed by Contract Aministrator.

.4 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

3.5 FIELD PAINTING

.1 Paint in accordance with Section 09 91 10 - Painting.

.1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP7 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 05 12 23 – Structural Steel For Buildings.

.2 Section 05 21 00 – Steel Joist Framing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM A653/A653M-01a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A792/A792M-01a, Specification for Steel Sheet, 55%Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International)

- .1 CSA C22.2 No.79-1978(R1999), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
- .2 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.
- .3 CSA-S136-94(R2001), Cold Formed Steel Structural Members.
- .4 CSA W47.1-92(R2001), Certification of Companies for Fusion Welding of Steel Structures.
- .5 CSA W55.3-1965(R1998), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .6 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.4 Canadian Sheet Steel Building Institute (CSSBI)

- .1 CSSBI 10M-96, Standard for Steel Roof Deck.
- .2 CSSBI 12M-96, Standard for Composite Steel Deck.

1.3 DESIGN REQUIREMENTS

.1 Design steel deck using limit states design in accordance with CSA S136.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/360 of span.

1.4 SHOP DRAWINGS

.1 Submit shop drawings erection and shoring drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Manitoba, Canada.

.3 Submit design calculations if requested by Contract Administrator.

.4 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

.5 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.

Part 2 Products

2.1 MATERIALS

.1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with ZF75 coating, for interior surfaces not exposed to weather, unpainted finish, thickness as indicated on structural drawings.

.2 Decks to be painted: zinc-iron alloy coated decks suitable for finish painting.

.3 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with ZF75, coating, for exterior surfaces exposed to weather, thickness as indicated on structural drawings.

.4 Acoustic insulation: fibrous glass 17.5 kg/m^3 density profiled to suit deck flutes.

.5 Closures: as indicated in accordance with manufacturer's recommendations.

.6 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.

.7 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

.8 Shear studs: to CSA W59.

2.2 TYPES OF DECKING

.1 Steel roof deck: thickness and profile as per structural drawings, interlocking side laps.

.2 Acoustic steel roof deck: thickness and profile as per structural drawings, non-cellular, perforated on vertical face of flutes, interlocking side laps. Flat sheet for cellular deck.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S136.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

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

3.2 ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136, and in accordance with reviewed erection drawings.

.2 Butt ends: to 1.5 to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.

.3 Lap ends: to 50 mm minimum.

.4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.

.5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

.6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

.7 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.

.8 Place and support reinforcing steel as indicated.

3.3 CLOSURES

.1 Install closures in accordance with approved details.

3.4 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as with minimum L64x64x6.4 each side of opening perpendicular to flutes. Angle shall be welded to at least two flutes on each side of opening.

.3 Deck supplier shall reinforce openings over 300mm to 450mm across the flutes with suitable reinforcement based on a structural analysis of the loads involved.

.4 For deck openings with any one dimension greater than 450 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.5 CONNECTIONS

.1 Install connections in accordance with CSSBI recommendations as indicated.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Wind-bearing formed steel stud for exterior wall assembly framing.

1.2 RELATED REQUIREMENTS

.1 Section 05 12 23 - Structural Steel for Buildings: Structural building framing.

.2 Section 06 16 00 – Sheathing: exterior gypsum sheathing.

.3 Section 07 42 43 - Composite Wall Panels

.4 Section 09 22 16 - Non-structural Metal Stud Framing: Light weight, non-load bearing metal stud framing.

1.3 DEFINITIONS

.1 Delegated Design Professional: The specialist or supporting design professional contracted to the contractor, fabricator or manufacturer to design and/or review specific building components or sub-components, and provide Shop Drawings and Delegated Design Submittals to meet the requirements of authorities having jurisdiction.

1.4 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM A307-14 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

.2 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 Canadian Standards Association (CSA International)

.1 CSA S16-14, Limit States Design of Steel Structures

.2 CSA S136-12, North American Specification for the Design of Cold-Formed Steel Structural Members

.3 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI Fact Sheet No. 3, June 1994, Care and Maintenance of Prefinished Sheet Steel Building Products

.4 ECD Energy & Environment Canada

.1 Green Globes Canada, Design for New Construction and Major Retrofits v.2 2014

1.5 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 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 Describe method for securing studs to tracks and for bolted framing connections.

.4 Provide Shop Drawings stamped and signed by the Delegated Design Professional.

1.6 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Delegated Design Submittals:

.1 Submit documentation indicating compliance to performance/design criteria, signed and sealed by the delegated design professional responsible for their preparation.

.1 Design Data: Include material data, calculations and details.

1.7 QUALITY ASSURANCE

.1 Delegated Design Professional Qualifications: Professional structural engineer experienced in design of this Work and licensed in the Province of Manitoba.

.2 Products of This Section: Shall have Environmental Product Declaration (EPD) certification.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Protect steel studs during transportation, site storage and installation in accordance with CSSBI Sheet Steel Facts No. 3.

.2 Handle and protect galvanized materials from damage to zinc coating.

Part 2 Products

2.1 PERFORMANCE AND DESIGN CRITERIA

.1 Delegated Design: Design metal framing by a licensed design professional using performance and design criteria indicated.

.2 Base design on limit states design principles using factored loads and resistances to CSA S16.

.3 Size components to withstand design loads shown on Structural Drawings.

.4 Maximum Allowable Deflection: L/360 of span.

.5 Wall Assembly:

.1 Design to CSA-S136.

.2 Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

.3 Design assembly to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

.4 Stud depths are shown on the Drawings. Adjust stud material thicknesses and spacing, as required by the design criteria. Use greater or lesser stud depths only if approved by the Contract Administrator.

2.2 FRAMING MATERIALS

.1 Framing Materials: Cold-rolled steel conforming to CSA-S136, with metallic coating to ASTM A653/A653M, minimum Z180 zinc coating thickness, except Z-girts and hat channels located outside exterior air/vapour barrier membrane minimum Z275 designation coating.

.2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit.

.1 Bottom track: single piece.

.2 Top track: two-piece telescoping.

2.3 ACCESSORIES

.1 Bracing, Furring, and Bridging: Formed sheet steel, thickness determined by performance requirements specified.

.2 Plates, Gussets, Clips: Formed sheet steel, thickness determined by performance requirements specified.

.3 Touch-Up Primer for Galvanized Surfaces: zinc-rich primer.

2.4 FASTENERS

.1 Bolts, Nuts and Washers: to ASTM A307, hot-dip galvanized.

.2 Screw Fasteners: low profile head, self-drilling, self-tapping sheet metal screws, corrosion protected with minimum zinc coating thickness of 0.008 mm. Screw length 5 mm longer than twice thickness of steel.

.3 Anchorage Devices: Corrosion-resistant; driven-in expansion anchors for fastening to concrete; powder actuated for fastening to steel.

Part 3 Execution

3.1 ERECTION OF STUD WORK

.1 Erect components to requirements of reviewed shop drawings.

.2 Coordinate installation of acoustic sealant with floor tracks.

.3 Place studs not more than 50 mm from abutting walls and at each side of openings. Connect studs to tracks using screw fasteners.

.4 Construct corners using minimum three studs. Double stud wall openings, door jambs, and window jambs.

.5 Erect load bearing studs one-piece full length. Splicing of studs is not permitted.

.6 Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.

.7 Install intermediate studs above and below openings to align with wall stud spacing.

.8 Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

.1 Nest top track into deflection channel 40 mm.

.2 Do not fasten tracks together.

.3 Stagger joints.

.9 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on Shop Drawings

.10 Attach cross studs to studs for attachment of fixtures anchored to walls.

.11 Touch-up damaged galvanized surfaces with primer.

3.2 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 centreline of last unreinforced cutout to end of member to less than 300 mm.

3.3 ERECTION TOLERANCES

.1 Section 01 73 00: 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 PROTECTION

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

.2 Repair damage to adjacent materials caused by structural metal stud installation.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This specification shall cover the fabrication and installation of the garbage bin enclosure.

1.2 RELATED SECTIONS

.1 Section 06 10 00 - Exterior Site Carpentry.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.

.2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass or latest.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA-G164-M93(R1998), Hot Dip Galvanized or Irregularly Shaped Articles, or latest.

.3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.

.4 CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.5 CSA W59-1989, R2001,Welded Steel Construction, Metal Arc Welding, Imperial Version.

.4 Painting for Exterior Applications:

.1 SSPC – Steel Structures Painting Councils.

.2 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.

.3 CAN/CGSB-1.181-92, Ready-mix, Organic Zinc-rich Coating.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit product data for:

.1 Paint product: two (2) copies of WHMIS MSDS – Material Safety Data Sheets.

.3 Submit samples for:

.1 Steel bar

.2 Steel round tubing

.3 Steel 'L' Angles

.4 Steel rectangular tubing

.4 Submit shop drawings for:

.1 Garbage Bin Enclosure.

.2 C.I.P. Concrete and Timber Bench.

.5 Use construction Drawings as reference only. Field verify as-built conditions and dimensions. Report any discrepancies to Contract Administrator if as-built conditions are significantly different from Drawings.

.6 Clearly indicate materials, sizes, assembly, welds, connections, joints, anchorage, fastener type and fastening method, finishes etc. and installation details.

.7 Provide a list of hardware and miscellaneous items.

.8 Provide templates, patterns, fixing diagrams, as required.

.9 Indicate related, adjacent materials, and connections.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to site, suitably packaged, clearly marked with identification symbols and/or information. Do not deliver materials long before they are required on site. Cause no delays to scheduling.

.2 Temporarily store materials in storage areas as directed by the Construction Manager.

.3 Store materials in a dry location off the ground, and prevent damage.

.4 Materials that have been damaged or deemed unfit for use during delivery or storage shall be immediately replaced at no cost to The City.

1.6 SITE CONDITIONS

.1 Make a careful examination of the site conditions and investigate all matters relating to the nature of the work to be undertaken, the means of access and egress, the rights and interests which may be interfered with during the construction of the work.

.2 Report any discrepancies or omissions to the Contract Administrator, who will issue written clarification. Oral interpretations or instructions are not acceptable.

1.7 QUALITY ASSURANCE

.1 Painter shall be trained and qualified industrial metal painting professionals with more than five (5) years of experience. Shop must be ISO certified and fully equipped to prepare, prime and paint large scale structural metal members and deliver them to site for field erection.

.2 All workmanship and all materials furnished and supplied under this specification shall be of the highest standards and are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection of materials, through to final acceptance of the Work.

.3 Strict conformance to this specification will be enforced. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance the requirements of this specification.

Part 2 Products

2.1 STEEL BAR

.1 10mm bar, steel, semi-gloss black enamel finish.

2.2 STEEL ROUND TUBING

.1 89mm Ø HSS round tubing, steel, semi-gloss black enamel finish.

2.3 STEEL 'L' ANGLES

.1 63.5 x 63.5 x 3mm Plate, flat black finish.

2.4 STEEL RECTANGULAR TUBING

25 x 51mm rectangular tubing, steel, flat black finish.

2.5 FASTENERS

.1 Stainless steel.

2.6 ACCESSORIES

.1 Welding materials: to CSA W59.

.2 Welding electrodes: to CSA W48 Series.

.3 Paint: Tremclad Flat Black.

.4 Paint: Tremclad Semi-glass Black.

.5 Anchor bolts: see structural.

.6 Grout: see structural.

Part 3 Execution

3.1 FABRICATION

.1 Obtain approval of samples and shop drawings prior to ordering materials and commencing fabrication.

.2 Preparation priming and painting of members shall be completed in the controlled environment of a paint shop if at all possible. If painting operations must occur in the field obtain Contract Administrators to review the Work that is to be completed in the field, prior to proceeding.

.3 Debur and degrease metal surfaces using products approved by the paint manufacturer.

.4 Conduct abrasive blasting to fully clean the metal.

.5 Pressure wash metal in accordance with all Federal, Provincial and local water consumption and disposal regulations. Contact Contract Administrator for review and approval of prepared surface.

.6 Paint shall be stored, thinned, handled, mixed and applied in accordance with SSPC-PA 1, Shop Field and Maintenance Coating of Steel, and per the express written specifications of the manufacturer.

.7 Apply paint coats only when temperatures can be controlled or predicted to be within the manufacturers acceptable window. When there is a drop in temperature after the coating is applied adjust recoat time period per manufacturers specifications.

.8 Paint shall be applied within twenty-four (24) hours of completion of surface preparation.

.9 Use spray gun system for main application and brushes of suitable size for field touch ups. Point spray gun at outside edges coating edges and seams thoroughly prior to coating remaining areas.

.10 Touch-up runs and snags immediately while paint application is in progress.

.11 Application related failures shall be corrected prior to the application of a subsequent coat.

.12 Where excessive coating thickness produces ‘Mud Cracking’ coating shall be scraped back to bare metal, and sanded to a soundly bonded coating layer then reapplied to the specified thickness.

.13 Apply as many coats as necessary to ensure even and proper coating of metal, to be reviewed and approved by the Contract Administrator.

3.2 DELIVERY TO SITE

.1 Allow all shop painted members to fully cure before preparing for shipment.

.2 Once fully cured wrap members in cellophane plastic or bubble wrap designed to protect finished surfaces without scratching or marring them during transport. Secure wrappings with appropriate tape or adhesives that are sturdy but can easily be removed at the site.

.3 Deliver to site with equipment suitable for carrying steel loads and capable of hoisting steel members over other features into their final locations.

3.3 INSTALLATION

.1 Erect metal work square, plumb, straight and true, accurately fitted, with tight joints and intersections.

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

.3 Exposed fastening devices to match finish and be compatible with material through which they pass, as per the drawings.

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

.5 Make field connections with high tensile bolts, or weld to CSA S16.1-M (latest).

.6 Touch up rivets, field welds, bolts and burnt or scratched surfaces after erection.

3.4 PAINT TOUCH-UPS

.1 Ensure all welding work and mechanical fasteners are wiped clean and free of oil, debris and grit.

.2 Apply touch-ups with appropriately sides brushes to get into all grooves and voids

.3 Thickness of touch-ups shall match thickness of adjacent paint

.4 Once all touch-ups are complete contact Contract Administrator for review and approval of metal work and coating.

3.5 ACCEPTANCE

.1 Work will be accepted only if it is erected true to the design intent in conformation with shop drawings and site instructions.

.2 Products shall be accepted if they meet the performance standards of the product supplier and match the sample accepted as the standard of performance at the commencement of painting.

.3 Painted surfaces shall be warrantied against corrosion, peeling and general failure for two (2) years after date of total performance.

3.6 CLEANING

.1 Upon completion of installation, remove construction and accumulated environmental dirt, surplus materials, rubbish, tools and equipment barriers in accordance with section 01 74 00 – Cleaning and Waste Processing.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Shop fabricated miscellaneous metal items.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Exterior Metal Fabrications

.2 Section 06 40 00 - Architectural Woodwork

.3 Section 09 91 10 - Painting: Paint finish

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with other work having a direct bearing on work of this Section.

.1 Coordinate work with installation of adjacent components or materials.

.2 Coordinate installation of anchorages for metal fabrications.

.3 Coordinate selection of shop primers with topcoats.

1.4 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI A14.3, Ladders - Fixed – Safety Requirements

.2 ASTM International (ASTM)

.1 ASTM A53/A53M-10, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

.2 ASTM A307-14 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

.3 ASTM B633-15 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

.4 ASTM E488/E488M-15 Standard Test Methods for Strength of Anchors in Concrete Elements

.3 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-W59-13 - Welded Steel Construction (Metal Arc Welding)

.4 The Society for Protective Coatings (SSPC)

1.5 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Shop Drawings:

.1 Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

.2 Indicate welded connections using standard welding symbols. Indicate net weld lengths.

.3 For items specified to conform to structural performance requirements, prepare Shop Drawings under direct supervision of a professional engineer responsible for their preparation.

.1 Include component structural and physical characteristics, calculations, dimensional limitations.

.2 Each shop drawing to bear seal and signature of the professional engineer.

1.6 QUALITY ASSURANCE

.1 Fabricator Qualifications: Company specializing in performing work of this Section.

.2 Professional Engineer Qualifications: Structural engineer experienced in design and installation of work indicated, licensed in the Province where the Project is located.

.3 Welders' Certificates: Certifying welders employed on the Work, verifying qualification within the previous 12 months to CSA standards.

.4 Welded Steel Construction: CSA-W59.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 20 – Waste Management and Disposal.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Design the following and similar items required to withstand loads, including comprehensive engineering analysis by a professional engineer, using performance requirements and design criteria specified or indicated, as required by applicable code:

.1 Under-counter steel supports.

.2 Ladders to ANSI A14.3. Fabricate ladder assembly including mounting brackets and attachments to support a uniform live load of 3.5 kg/m^2, and a concentrated load of 10 kg/m^2. Provide non-slip surface on top of each rung.

.3 Design guardrails, and connections to support minimum horizontal live load 0.75 kN/m or a concentrated load of 1.0 kN.

.2 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

.1 Temperature Change: 65 deg C, ambient; 100 deg C, material surfaces.

2.2 MATERIALS - STEEL

.1 Steel Sections and Plates: CSA-G40.20/G40.21, Grade 300W.

.2 Steel pipe: to ASTM A53/A53M standard weight.

.1 Exterior: galvanized finish, except where paint finish is indicated.

.3 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; consistent with design of fabricated item, of type compatible with material being fastened, corrosion-resistant, strength and size to suit application.

.4 Bolts, Nuts, and Washers: ASTM A307.

.5 Expansion Anchors: Anchor bolt and sleeve assembly capable of sustaining, without failure, a load equal to 4 times the load imposed when installed in concrete per ASTM E488.

.1 Material for Interior Locations: Carbon steel components, zinc-plated to conform to ASTM B633, Class Fe/Zn 5

.6 Welding Materials: Type required for materials being welded.

.7 Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.3 FABRICATION

.1 General: Fabricate items to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish and anchorage, but not less that that required to support structural loads.

.2 Fit and shop assemble items in largest practical sections, for delivery to site.

.3 Fabricate items with joints tightly fitted and secured.

.4 Fabricate guardrail with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

.5 Cut, drill and punch metals cleanly and accurately.

.6 Continuously seal joined members by intermittent welds and plastic filler in concealed locations; provide continuous welded in exposed locations.

.7 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

.8 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

.9 Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

.10 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

.11 Seal exterior steel fabrications to provide corrosion protection in accordance with CAN/CSA-S16.1.

.12 Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.4 FINISHES - STEEL

.1 General:

.1 Prime paint interior steel items, unless otherwise indicated.

.2 Galvanize exterior steel items, unless otherwise indicated.

.2 Prepare surfaces to be primed in accordance with SPCC SP 2.

.3 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

.4 Do not prime surfaces in direct contact with concrete or where field welding is required.

.5 Prime paint items with two coats.

.6 Prepare surface for finish painting where indicated to receive finish paint specified in Section 09 91 10 – Painting.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 70 00: Verify existing conditions before starting work.

.2 Verify that field conditions are acceptable and are ready to receive work.

.3 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

.1 Clean and strip primed steel items to bare metal where site welding is required.

.2 Supply steel items required to be cast into concrete with setting templates to appropriate sections.

3.3 INSTALLATION

.1 Install items plumb and level, accurately fitted, free from distortion or defects.

.2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

.3 Field weld components indicated on Shop Drawings. Perform field welding to CSA requirements.

.4 Obtain approval prior to site cutting or making adjustments not scheduled.

.5 After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

.1 Maximum Variation from Plumb: 6 mm per 3048 mm.

.2 Maximum Offset from True Alignment: 6 mm.

.3 Maximum Out-of-Position: 6 mm.

3.5 ADJUSTING AND CLEANING

.1 After installation, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

.2 Touch-up Painting: Immediately after installation, clean field welds, bolted connections and abraded areas of shop paint, and paint exposed areas with same material as used for shop priming.

3.6 SCHEDULES

.1 The following Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

.2 Crawlspace Ladder: Steel, with flat bar side rails; welded steel rungs of solid rod size and spacing indicated; complete with steel mounting brackets and attachments.

.1 Finish: shop prime paint; site finish painted.

.3 Roof Access Hatch Ladder: As specified for crawlspace ladder, but complete with safety cage.

.1 Safety Cage:

.1 Provide primary hoops at tops and bottoms of cages. Provide secondary intermediate hoops spaced not more than 1200 mm o.c. between primary hoops.

.2 Fasten assembled safety cage to ladder rails and adjacent construction by welding or with bolted fasteners unless otherwise indicated.

.2 Finish: shop prime painted; site finish painted.

.4 Under-Counter Supports:

.1 Channels or angles, welded construction, sized to support loads. Provide baseplates with drilled holes for attachment to structure.

.2 Conceal from view to greatest extent possible.

.3 Finish: Shop prime painted.

.5 Guardrail: As detailed; galvanized finish.

.6 Miscellaneous Framing and Supports:

.1 General: Provide steel framing and supports not specified in other Sections as need to complete the Work, including:

.1 Framing and supports for mechanical and electrical equipment.

.2 Concealed supports for interior curtainwall.

.3 Roof and floor opening frames.

.4 Anchor plates and angles concealed in walls to support wall-mounted items.

.2 Fabricate items from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

.3 Include brackets, clips, anchors and fasteners for installation.

.4 Finish: Shop prime painted.

END OF SECTION