Part 1 General

1.1 SECTION INCLUDES

.1 Structural steel framing members, complete with required braces, bolts, nuts, shims and anchor bolts.

.2 Base plates, weld plates, bearing plates and shear stud connectors into concrete.

.3 Grouting under base plates and bearing plates.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

.1 Anchors for casting into concrete.

1.3 RELATED SECTIONS

.1 Section 052100 - Steel Joists.

.2 Section 053100 - Metal Decking: Support framing for small openings in roof deck.

.3 Section 055000 - Metal Fabrications: Non-framing steel fabrications affecting structural steel work.

.4 Section 099000 - Painting.

1.4 REFERENCES

.1 ASTM A307 - Bolts for Structural Use.

.2 ASTM A325 - High Strength Bolts for Structural Steel Joints.

.3 ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.

.4 CAN3-G40.20M - General Requirements for Rolled or Welded Structural Quality Steel.

.5 CAN3-G40.21M - Structural Quality Steels.

.6 CAN3-G164M - Hot Dip Galvanizing of Irregularly Shaped Articles.

.7 CAN3-S16.1M - Steel Structures for Buildings - Limited States Design, including Supplements.

.8 CGSB 85-GP-10M - Shop Painting Structural Steel.

.9 CGSB 85-GP-16M - Painting Galvanized Steel.

.50 CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures.

.11 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.12 CSA W59 - Welded Steel Construction Metal-Arc Welding.

.13 SSPC - Steel Structures Painting Council.

1.5 SUBMITTALS

.1 Submit shop drawings to requirements of Section 013300.

.2 Indicate on shop drawings:
- .1 Profiles, sizes, spacing, cambers and locations of structural members.
- .2 Connections, attachments, size and type of fasteners.
- .3 Indicate welded connections with CSA welding symbols. Indicate net weld lengths.

.3 Prepare shop drawings under the seal of a professional structural engineer registered in the Province of Manitoba.

.4 Submit shop drawings for anchor bolts, inserts, weld plates, etc. to be used by foundation contractor prior to member shop drawings. The schedule of this submission should be coordinated with the foundation contractor.

.5 Welders' Certificates: Submit under provisions of Section 013300 certifying welders employed on the Work.

1.6 QUALITY ASSURANCE

.1 Fabricate structural steel members in accordance with CISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

.2 Perform Work in accordance with CISC - Specification for Architectural Exposed Structural Steel.

1.7 QUALIFICATIONS

.1 Fabricator: Company specializing in fabricating structural steel in accordance with CAN3-S16.1M with 15 years documented experience.

.2 Welder: Company specializing in welding structural steel components in accordance with CSA W47.1, CSA W55.3, and CSA W59 with 15 years documented experience.

.3 Erector: Company specializing in performing the work of this section with a minimum 15 years experience.

1.8 CONNECTIONS

.1 Connections shown but not detailed on drawings are shown for general concept only.

.2 Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the Province of Manitoba.

.3 Connection of beams to weld plates shall be designed pinned. Maximum eccentricity to be 75 mm from face of weld plate to centreline of bolted connection.

.4 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for Fusion Welding of Steel Structures.

1.9 FIELD MEASUREMENTS

.1 Verify that field measurements are as shown on Drawings.

Part 2 Products

2.1 MATERIALS

.1 Structural Steel Members: CAN3-G40.20M and CAN3-G40.21M, Grade 350W for W-shape members, Grade 300W for channels, angles and plates.

.2 HSS: CAN3-G40.20 and CAN3-G40.21, Grade 350W, Class C.

.3 Anchor bolts: ASTM A307.

.4 Shear stud connectors: CAN 3-S16.1M forged steel, headed, uncoated.

.5 Bolts, Nuts, and Washers: ASTM A325.

.6 Welding Materials: CSA W59, type required for materials being welded.

.7 Primer: CGSB 85-GP-10M for plain steel surfaces and CGSB 85-GP-16M for galvanized surfaces.

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

2.2 FABRICATION

.1 Fabricate structural steel members in accordance with CAN3-S16.1M.

.2 Continuously seal joined members by continuous welds. Grind exposed welds smooth.

.3 Camber structural members as indicated on drawings.

.4 Provide anchor bolts and weld plates as indicated on drawings for installation by other sections.

2.3 FINISH

.1 Clean and prepare structural steel members for finishing.

.2 Shop prime structural steel members as per general notes on structural drawings. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete. Brush apply primer after connection has been made.

.3 Leave all steel free of grime or dirt.

.4 Galvanize all ledger/shelf angles supporting masonry veneer on exterior skin of building, and at all exterior steel framing shown. Touch up field cut, welded and/or damaged galvanized surfaces with zinc-rich paint in accordance with ASTM A780.

Part 3 Execution

3.1 EXAMINATION

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

.2 Beginning of installation means erector accepts existing conditions.

3.2 ERECTION

.1 Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

.2 Field weld components indicated on drawings.

.3 Do not field cut or alter structural members without approval of the Contract Administrator.

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

.5 Touch up galvanized surfaces with zinc-rich primer where burned by welding.

.6 Coordinate grouting under base plates with Section 033000.

3.3 ERECTION TOLERANCES

.1 Maximum Variation From Plumb: 6 mm per storey, non-cumulative.

.2 Maximum Offset From True Alignment: 6 mm.

Part 1 General

1.1 SECTION INCLUDES

.1 Open web steel joists, with bridging, attached seats and anchors.

.2 Loose bearing plates and anchor bolts for site placement.

.3 Framed floor and roof openings greater than 450 mm.

1.2 RELATED SECTIONS

.1 Section 051200 - Structural Steel.

.2 Section 053100 - Metal Deck: Support framing for small openings in deck.

.3 Section 055000 - Metal Fabrications: Non-framing steel fabrications.

.4 Section 099000 - Painting.

1.3 REFERENCES

.1 CSA G40.21M - Structural Quality Steel.

.2 CSA S16 - Steel Structures for Buildings.

.3 CGSB 85-GP-10M - Shop Painting Structural Steel.

.4 CSA W47.1 - Certification of Companies for Fusion Welding of Steel Structures.

.5 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.6 CSA W59 - Welded Steel Construction (Metal/Arc Welding).

.7 SSPC - Steel Structures Painting Council.

1.4 SHOP DRAWINGS

.1 Submit shop drawings to requirements of 013300.

.2 Shop Drawings to indicate:
- .1 Standard designations, configuration, sizes, spacing, locations of joists, and joist leg extensions.
- .2 Bridging, connections, and attachment details.
- .3 Cambers and loadings.

.3 Prepare shop drawings under the seal of a professional structural engineer registered in the Province of Manitoba.

1.5 QUALIFICATIONS

.1 Fabricator: Company specializing in performing the work of this Section with minimum 10 years experience.

.2 Welder: Company specializing in welding structural steel components in accordance with CSA W47.1, CSA W55.3, and CSA W59 with 10 years experience.

.3 Erector: Company specializing in performing the work of this Section with minimum 10 years experience.

.4 Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the Province of Manitoba. Provide seal.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and protect products to requirements of Section 016100.

.2 Protect joists from distortion or damage.

1.7 FIELD MEASUREMENTS

.1 Verify that field measurements are as shown on Drawings.

Part 2 Products

2.1 MATERIALS

.1 Joist Members: shall be of weldable steel, conforming to requirements of CSA G41.21, min. Grade 300W.

.2 Bridging and Bearing Plates/Angles: of weldable steel, conforming to requirements of CSA G20.21, yield strength to be 300 MPa minimum.

.3 Bolts, Nuts and Washers: ASTM A325.

.4 Primer: CGSB 85-GP-10M.

.5 Structural Steel for Supplementary Framing and Joist Leg Extensions: CAN/CSA-G40.21M, Grade 300W.

.6 Welding Materials: CSA W59, type required for materials being welded.

2.2 FABRICATION

.1 Fabricate steel joists in accordance with drawings and requirements of CSA S16 and applicable portions of CSA S16S1.

.2 Exposed joists to be to profiles shown on the drawings. Fabricate joists of straight members arranged to form a triangulated truss-type structure without joint eccentricities.

.3 Provide bottom and top chord extensions as indicated.

.4 Camber joists to accommodate dead load deflection. Provide residual cambers as indicated on drawings.

.5 Frame special sized openings in joist chord framing as detailed.

.6 Provide base plates as indicated on drawings to be installed by other sections.

2.3 FINISH

.1 Clean, prepare and shop prime joists. Apply one coat of primer for roof and floor joists. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.

Part 3 Execution

3.1 EXAMINATION

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

.2 Beginning of installation means erector accepts existing conditions.

3.2 ERECTION

.1 Erect and bear joists on supports and in accordance with approved drawings.

.2 Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment until completion of erection and installation of permanent bridging and bracing.

.3 Coordinate placement of anchors in masonry and concrete construction for securing bearing plates.

.4 After joist alignment and installation of framing, field weld joist seat to bearing plates and supporting members.

.5 Position and field weld joist chord extensions and wall attachments.

.6 Frame floor and roof openings greater than 450 mm with supplementary framing.

.7 Do not permit erection of decking until joists are braced and secured.

.8 Do not field cut or alter structural members without approval of joist manufacturer.

.9 After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete. Use a primer consistent with that used to provide shop coat.

3.3 ERECTION TOLERANCES

.1 Maximum Variation From Plumb: 6 mm.

.2 Maximum Offset From True Alignment: 6 mm.

Part 1 General

1.1 SECTION INCLUDES

.1 Roof and floor steel deck and accessories.

.2 Framing for openings up to and including 450 mm.

1.2 RELATED SECTIONS

.1 Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.

.2 Section 051200 - Structural Steel.

.3 Section 052100 - Steel Joists: Structural framed openings larger than 450 mm.

1.3 REFERENCES

.1 ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural Physical Quality.

.2 CAN3-G40.21M - Structural Quality Steels.

.3 CSA S136 - Cold Formed Steel Structural Members.

.4 CSA W55.3 - Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.5 CSA W59 - Welded Steel Construction Metal-Arc Welding.

.6 CSSBI - Canadian Sheet Steel Building Institute.

1.4 PERFORMANCE REQUIREMENTS

.1 Design metal decking in accordance with CSSBI.

.2 Calculate to structural working stress design and maximum vertical deck deflection of 1/240.

.3 Lateral deflection of diaphragm shall not exceed 1/500 of the storey height.

1.5 SUBMITTALS

.1 Submit shop drawings and product data to requirements of Section 013300.

.2 Shop Drawings to indicate decking plan, support locations, projections, openings and reinforcement, pertinent details, and accessories.

.3 Design deck layout, spans, fastening, and joints, under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the Province of Manitoba.

.4 Shop drawings to be sealed by a professional engineer registered in the Province of Manitoba.

1.6 QUALIFICATIONS

.1 Installer: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and protect products to requirements of Section 013300.

.2 Cut plastic wrap to encourage ventilation.

.3 Store decking on dry wood sleepers and slope for positive drainage.

1.8 FIELD MEASUREMENTS

.1 Verify that field measurements are as shown on Shop Drawings.

Part 2 Products

2.1 MATERIALS

.1 Non-acoustic decking: RD 38 or RD 938 or approved equal.

.2 Sheet Steel: CSSBI 101, Grade A structural quality, zinc coated to ZF075.

.3 Bearing Angles: CAN3-G40.21M steel, Grade 300W.

.4 Welding Materials: CSA W55.3 and CSA W59.

.5 Touch-Up Primer: Zinc chromate type.

2.2 ACCESSORIES

.1 Flute Closures: Closed cell foam rubber, 25 mm thick; profiled to fit tight to the decking.

2.3 FABRICATION

.1 Metal Roof Decking: Sheet steel, configured as follows:

Span Design:	multiple
Minimum Metal Thickness	
Excluding Finish:	0.76 mm
Nominal Height:	38 mm, fluted profile
Side Joints:	lock seam
Flute Sides:	Plain vertical face
Flute Spacing:	150 mm o/c.

.2 Metal Floor Decking: Sheet steel, galvanized configured as follows:

Span Design:	multiple
Minimum Metal Thickness	
Excluding Finish:	0.76 mm
Nominal Height:	38 mm, fluted profile
Side Joints:	lock seam
Flute Sides:	diagonally ribbed for improved concrete bond
Flute Spacing:	150 mm o/c

.3 Metal Floor Decking at Composite Beams: Sheet steel, galvanized configured as follows:

Span Design:	multiple
Minimum Metal Thickness	
Excluding Finish:	0.76 mm
Nominal Height:	38 mm, inverted fluted profile
Side Joints:	lock seam
Flute Sides:	diagonally ribbed for improved concrete bond
Flute Spacing:	150 mm o/c

.4 Metal Closure Strips, Wet Concrete Stops, Cover Plates, and Related Accessories: 0.76 mm thick galvanized sheet steel.

Part 3 Execution

3.1 EXAMINATION

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

.2 Beginning of installation means installer accepts existing conditions.

3.2 INSTALLATION

.1 Erect metal decking in accordance with CSSBI standards and manufacturer's instructions.

.2 Bear decking on steel supports with 50 mm minimum bearing. Align and level.

.3 Fasten ribbed deck to steel support members at ends and intermediate supports with fusion welds through weld washers at spacings indicated on drawings. Deck shall not be screwed to steel support members.

.4 Weld in accordance with CSA W55.3.

.5 Mechanically clinch male/female side laps at spacings indicated on drawings.

.6 Reinforce steel deck openings from 150 to 450 mm in size with 64 x 64 x 6.4 mm steel angles. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute. Reinforce openings over 450 mm in size in accordance with structural framing details indicated on drawings.

.7 Install 150 mm minimum wide sheet steel cover plates, of same thickness as decking, where deck changes direction. Spot weld in place at maximum 300 mm on centre.

.8 Install sheet steel closures and angle flashings as required to close openings between deck and walls, columns, and openings.

.9 Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint. Use type of primer recommended for galvanized surfaces.

Part 1 General

1.1 SECTION INCLUDES

.1 Shop fabricated ferrous metal items galvanized and prime painted.

.2 Shop fabricated stainless steel items.

.3 Steel stair frame of structural sections, with risers, stair treads and landings.

1.2 RELATED SECTIONS

.1 Section 03 31 00-Cast-In-Place Concrete: concrete filled pan treads.

.2 Section 05 12 00-Strucrural Steel.

.3 Section 05 21 00-Steel joists.

.4 Section 06 20 00 - Finish Carpentry

.5 Section 09 90 00 - Painting: Paint finish.

1.3 REFERENCES

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

.2 ASTM A36 - Structural Steel.

.3 ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

.4 ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.5 ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.6 ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.7 ASTM A283 - Carbon Steel Plates, Shapes, and Bars.

.8 ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

1.4 SUBMITTALS

.1 Section 01 33 00: Submission procedures.

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

.3 Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.5 QUALIFICATIONS

.1 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

Part 2 Products

2.1 MATERIALS - STEEL

.1 Steel Sections: ASTM A36. .

.2 Plates: ASTM A283 .

.3 Pipe: ASTM A53, Grade B Schedule 40 .

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

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

.6 Ladders: ANSI A14.3.

.7 Shop and Touch-Up Primer: red oxide.

2.2 MATERIALS - STAINLESS STEEL

.1 Stainless Steel: ASTM A167, Type 304 commercial grade, No. 4 finish.

2.3 FABRICATION

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

.2 Fabricate items with joints tightly fitted and secured.

.3 Delete the following paragraph if noted on drawings.

.4 Continuously seal joined members by continuous welds.

.5 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.

.6 Weld and form edges, ends, and joints smooth. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.

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

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

2.4 FABRICATION - PAN STAIRS AND LANDINGS

.1 Fabricate stairs and landings with closed risers and treads of metal pan construction, ready to receive concrete.

.2 Form treads and risers with minimum 3.4 mm thick sheet steel stock.

.3 Secure reinforced tread pans to stringers with clip angles ; welded bolted in place.

.4 Form stringers with rolled steel channels.

.5 Form landings with minimum 3.4 mm thick sheet stock. Reinforce underside with angles to attain design load requirements.

.6 Form balusters as noted on drawings welded to stringers.

.7 Prime paint components.

2.5 FABRICATION TOLERANCES

.1 Squareness: 3 mm maximum difference in diagonal measurements.

.2 Maximum Offset Between Faces: 1.5 mm.

.3 Maximum Misalignment of Adjacent Members: 1.5 mm.

.4 Maximum Bow: 3 mm in 1.2 m.

.5 Maximum Deviation From Plane: 1.5 mm in 1.2 m.

2.6 FINISHES - STEEL

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

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

.3 Prime paint items with one coat.

.4 Structural Steel Members: Galvanize after fabrication to ASTM A123. Provide minimum 380 g/sq m galvanized coating.

Part 3 Execution

3.1 EXAMINATION

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

3.2 PREPARATION

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

.2 Do not embed aluminum products into cementitious materials due to inevitable corrosion deterioration.

.3 Supply steel items required to be cast into concrete OR embedded in masonry 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.

.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 story, non-cumulative.

.2 Maximum Offset From True Alignment: 6 mm.

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

3.5 SCHEDULE

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

.2 Schedule each fabrication separately. Describe items, size, shape, materials, finish, and other relevant information.

.3 Crawlspace Ladder: Steel, as detailed; prime paint finish.

.4 Roof ladder: Steel as detailed; prime paint finish.

.5 Guard Rails: As detailed; prime paint galvanized finish.

.6 Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

.7 Ledge and Shelf Angles, Not Attached to Structural Framing: For support of masonry ; galvanized finish.

.8 Lintels: As detailed; galvanized finish.

.9 Door Frames for Overhead Door Openings: Angle sections; prime paint finish.

.10 Stainless steel table tops (Rowdy rooms): 1.5 mm. Stainless steel; Edges turned down 38 mm and back 12 mm. Over veneer core plywood. Provide stainless steel pedestal and anchor plate as noted on drawings.

.11 Stainless steel liner for cubbies: 304 stainless steel No. 4 finish; 1.2 mm thick. Attach using pan head stainless steel screws.

.12 Stainless steel liner for boot rack in locker base: 304 stainless steel; 1.2 mm thick. Attach using pan head stainless steel screws.

.13 Floor shackles: as detailed Stainless steel No.4 finish.

.14 Wall shackles: as detailed set in concrete block wall: stainless steel, No 4 finish.

.15 Wall shackles in garage: 304 Stainless steel U bolt with strap plate and hex nuts. Attach strap plate with nuts and washer to threaded end, and embed in concrete block. U bolt dimension: 112 mm inside; 150 mm length x 12 mm dia. Thread.

END OF SECTION