

1 General

1.1 RELATED SECTIONS

- .1 Following description of work is included for reference only and shall not be presumed to be complete:
 - .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 03 30 00 - Cast-in-Place Concrete.
 - .3 Section 09 91 00 - Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A123/A123M-09, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .4 ASTM A325M-07a, Specification for High-Strength Bolts for Structural Steel joints [Metric].
 - .5 ASTM A653M-09a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .6 ASTM F436M-10, Specification for Hardened Steel Washers.
 - .7 ASTM F844-07a, Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA G40.20-04/G40.21-04, 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 S16-09, Design of Steel Structures.
 - .4 CSA W59-03 (R2008), Welded Steel Construction (Metal Arc Welding).
 - .5 CSA S136-07 - North American Specification for the Design of Cold Formed Steel Structural Members (Using Appendix B provisions applicable to Canada).

1.3 SYSTEM DESCRIPTION

- .1 Design Requirements:
 - .1 Drawings and details are diagrammatic and are intended to show design concept, configuration, components and arrangements; they are not intended to identify nor solve completely problems of thermal and structural movements, assembly framing, fixings and anchorages.
 - .2 Design work to withstand within acceptable deflection limitations, variations from plumb in vertical and horizontal lines, its own weight, forces applied by movements of building structure and attached adjacent components and maximum design loads due to pressure and suction of wind, snow, ice, rain and hail.
 - .3 Design load bearing structures to NBC requirements and provide miscellaneous steel supports and anchors to suit design. Conform to CAN/CSA-S16.1 and CAN/CSA-S136.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's literature, data sheets for each type of material provided

under this Section for Project. Data sheets shall provide all required information. Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials in clean and safe conditions and give adequate warning of maintenance practices of materials detrimental to specified materials. Submit manufacturer's installation instructions.

- .2 Material Safety Data Sheets:
 - .1 Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designed by Consultant.
- .3 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 In addition to minimum requirements indicated following:
 - .1 Large scale details of members, materials and connections.
 - .2 Joint details.
 - .3 Methods of setting, sealing, securing, anchorage.
 - .4 Field connections.
 - .5 Submit Shop Drawings for following work bearing the stamp of a Professional Engineer registered in the Province of Prince Edward Island.
- .4 Samples:
 - .1 Extruded and formed metals: minimum 300 mm long.
 - .2 Metal sheet: minimum 300 mm square and of specified thickness.

1.5 QUALITY ASSURANCE

- .1 Test Reports: Submit 6 copies of certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Submit 6 copies of product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Welding: Provide welding in accordance with CSA W59-m performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.
- .4 Structural Design and Inspection:
 - .1 Employ a professional structural engineer, registered in the province of Prince Edward Island to:
 - .1 Design components of the work of this Section requiring structural performance.
 - .2 Be responsible for full assemblies and connections
 - .3 Be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
 - .4 Be responsible for production and review of Shop Drawings.
 - .5 Inspect work of this Section during fabrication and erection.
 - .6 Stamp and sign each shop drawing.
 - .7 Provide site administration and inspection of this part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, undercover storage locations. Do not load areas beyond the designed limits.
- .2 Handle and store metal materials at job site in such a manner to prevent damage to other materials, (to existing buildings) or property.

- .3 Handle components with care, and Provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate for disposal waste material generated by this Section.
- .2 Place in appropriate on-site bins in accordance with Waste Management Plan.
- .3 A clean worksite is mandatory at all times.

2 Products

2.1 MATERIALS

- .1 Steel sections and plates: New Material Conforming to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Hollow Structural Sections: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.
- .3 Steel Pipe: ASTM A53, Type E or S, Grade A or B, Standard weight, Schedule 40.
- .4 Stainless Steel:
 - .1 Provide highest architectural quality in various forms, straight and true. Ensure there are no scratches, scars, creases, buckles, ripples or chatter marks. Provide finished surfaces suitable for polishing where required. Ensure finished surfaces exposed to view are free of pitting, seam marks, roller marks, oil-canning, stains, discolorations or other imperfections.
- .5 Welding Materials: Conforming to CSA W48.1-M and CSA W59-M.
- .6 High Strength Bolts: Supply bolts, nuts and washers conforming with ASTM A 325M. Supply each type and size of bolt and nut of same manufacture and of same lot.
 - .1 Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
 - .2 Nuts: Heavy hexagon semi-finished nuts.
 - .3 Washers: For general use bolt, nut and stud application to provide increased bearing surfaces, spacing and to prevent galling. Flat and smooth hardened washers, quenched and tempered to suit applications and conforms to ASTM F844. Provide AISI Type 304 stainless steel washers at exterior locations.
 - .4 Lock Washers: Helical spring type steel "lock" washers to suit applications and conforms to federal specification FF-W-84. Provide AISI Type 304 stainless steel lock washers at exterior locations.
 - .5 Security Fasteners: Button head Torx® Plus R screw tamper resistant # 10, 25 mm long 2 per glass stop minimum stainless steel machine screws.
- .7 Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming with ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm) beyond nut, without the sue of washers. Supply anchor bolts of lengths noted, but projecting not less than 13 mm beyond nut unless otherwise noted.
- .8 Galvanized Primer Paint: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal.
- .9 Galvanized: Hot dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA-G164-M.
- .10 Galvanized Sheet Steel: Supply 0.91 mm (20 ga) core thickness commercial quality to ASTM A653M, CS Type A, with Z275 zinc coating designation to ASTM A653M.
- .11 Grout:

- .1 Cementitious, non shrinking, non expanding grout: 'Sika Grout 212' by Sika Canada Inc., or 'Non Shrink Structural Grout - Dry Pack Grout' by Euclid Chemical Company or 'Sealtight CG 86 Construction Grout' by W.R. Meadows.
- .2 Epoxy, non-shrinking, non expanding grout: 'Sika Anchor Fix.

2.2 FABRICATION

- .1 Fabricate each item of work of this Section in accordance with following general requirements:
 - .1 Members square and straight.
 - .2 Members plumb and true.
 - .3 Joints accurately and tightly fitted.
 - .4 Intersecting members in true, finish planes.
 - .5 Fasteners concealed.
- .2 Fabricate, fit and assemble work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.
- .3 Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plate and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.
- .4 Isolate dissimilar metals to prevent galvanic corrosion.
- .5 Weld connections unless otherwise indicated.
- .6 Shop Welding:
 - .1 Execute welding to avoid damage or distortion to work. Should there be, in the opinion of Consultant or Inspection Company, doubts as to adequacy of welds, they shall be tested for efficiency and any work not meeting Standards be removed and replaced with new work satisfactory to Consultant. Carry out welding in accordance with following standards:
 - .1 Fabricator shall be fully certified by Canadian Welding Bureau for fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.
 - .2 CSA W48-M - for Electrodes (if rods are used, only coated rods are allowed).
 - .3 CSA W59-M - for design of connections and workmanship.
 - .4 CSA W117.2 - for safety.
- .7 Thoroughly clean welded joints and steel exposed for a sufficient space to properly perform welding operation. Neatly finish welds. Ensure welds exposed to view and finish painted are continuous and ground smooth.
- .8 Provide exposed metal fastenings and accessories of same material, texture, color and finish as base metal to which they are applied or fastened.

2.3 FINISHES

- .1 Cleaning and Shop Painting:
 - .1 Clean steel to SSPC SP6 and remove loose mill scale, weld flux and splatter.
 - .2 Shop prime steel with 1 coat of primer paint to dry film thickness of 0.025 mm (1 mil). Paint on dry surfaces free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
 - .3 Shop prime non galvanized perimeter steel members and structural steel members to receive sprayed fire resistive materials with 1 coat of high performance corrosion protection primer to dry film thickness of 0.025 mm (1 mil). Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding

- application methods, equipment, temperature, and humidity conditions.
- .4 Shop prime galvanized steel in accordance with CAN/CGSB-85.10.
- .5 Clean but do not paint surfaces being welded in the field and surfaces in contact after assembly.
- .2 Hot Dip Galvanizing:
 - .1 After fabrication, hot dip galvanize specific miscellaneous steel items noted on Drawings and/or called for herein. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with "Galvafruid" by W.R. Meadows in accordance with manufacturer's printed directions.
 - .2 Galvanized members exposed to elements when in final location; members embedded in concrete; members specified in this Section or noted on Drawings.
 - .3 Hot-dip galvanize members, in accordance with CAN/CSA-G164-M and the requirements of following ASTM standards, with minimum coating weights or thickness as specified:
 - .1 Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123M; average weight of zinc coating per sq/ft of actual surface, for 4.8 mm and less thickness members 2 ounces, for 6 mm and heavier members 2.3 ounces.
 - .2 Iron and Steel Hardware: ASTM A153M; minimum weight of zinc coating, in ounces per sq ft of surface shall be in accordance with Table 1 of ASTM A153M, for the various classes of materials used on the Project.
 - .3 Steel Sheet: ASTM A653M; weight of zinc coating, per sq ft on both sides of sheet. Coating designation Z275 (G90), minimized spangle and chemically treated.
- .3 Color: to be selected by Consultant.
- .4 Zinc-rich primer: Ready, mixed, zinc-rich primer conforming to CAN/CGSB-1.181 Acceptable Products and manufacturers shall be Sealtight Galvafruid Zinc-Rich Coating by W.R. Meadows of Canada Limited, or Zinc Clad No. 7 Organic Zinc Rich Primer by Sherwin Williams Company of Canada Ltd., or other Product and manufacturer acceptable to Consultant.
- .5 Isolation Coating: Bituminous paint, alkali-resistant bituminous paint or epoxy resin solution to provide dielectric separation which will dry to be tack-free and withstand high temperatures. Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers. Carboline Bitumastic 50 by Carboline Canada, or Copper Creek Top Service 760 Black by Sherwin Williams Company, 410-02 by Bakor Inc. or other Product and manufacturer acceptable to Consultant.

2.4 SECURITY MESH PARTITIONS

- .1 Fabricate support framing above ceiling from steel angles as indicated. Weld framing and bracings to roof structure to provide support for continuous ceiling angle located directly below underside of ceiling.
- .2 Fabricate partition framing and doors from HSS as indicated c/w steel flat bar retainers for wire mesh screening. Weld to ceiling angle and anchor to concrete floor slab.
- .3 Wire mesh screening: welded wire mesh, hot-dipped galvanized after fabrication, 25mm square pattern fabricated from 2mm diameter wire.
- .4 Acceptable Material:
 - .1 Greening Donald Co. Ltd. Regalvanized Hardware Grade Cloth.
- .5 Fabricate wire mesh screening from flat sheets cut to suit framing. Tack weld at 150mm o.c. to framing members and install flat bar retainers as indicated.
- .6 Fabricate doors c/w hinges and hasps as indicated. Weld hinges to door and framing member.

- .7 Provide partitions c/w all fasteners and anchoring devices.

3 Execution

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building 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 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 INSTALLATION

- .1 Verify dimensions at the Place of the Work to ensure work of this Section fits to that of other parts of the Work.
- .2 Erect the work of this Section plumb, square, true and level.
- .3 Securely anchor work of this Section and rivet, weld or bolt to structural framing of the building. Where secured to concrete, Provide bolts for setting in concrete. Provide expansion bolt supports to masonry.
- .4 Provide necessary fitting, setting and cutting required in connection with the fitting of work of this Section to other parts of the Work.
- .5 Field Painting: Paint bolt heads, washers, nuts, field welds and previously unpainted items. Touch up with matching paint, shop primer damaged during transit and installation.
- .6 Erect stair work to line, plumb, square, true and level, with runs of stairs registering level with floor levels.

3.3 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .3 On completion of installation, carefully clean metal work.

END OF SECTION
