

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .3 Section 03 30 00 – Cast-in-Place and Pre-Cast Concrete

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A53/A53M-20, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
  - .3 ASTM A500/A500M-21a, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural tubing in rounds and Shapes
  - .4 ASTM A615/A615M-20, Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA S16-14 (R2019), Design of Steel Structures.
  - .4 CSA W48-19, Filler Metals and Allied Materials for Metal Arc Welding.
  - .5 CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.
  - .6 CSA W59-18, Welded Steel Construction.
  - .7 CSA S6-19, CSA S6 Canadian Highway Bridge Design Code (CHBDC).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
  - .2 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of New Brunswick, Canada.

- .3 Indicate materials, all necessary geometric details, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials from damage.
- .2 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new.
- .3 Packaging Waste Management: as much as possible, remove for reuse by manufacturer any pallets, crates, padding and packaging materials.

#### **1.6 WASTE MANAGEMENT DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

#### **1.7 MEASUREMENT FOR PAYMENT**

- .1 Refer to Section 01 29 10 – Measurement and Payment.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Steel sections, plates, angles, and round bar: to CSA G40.20/G40.21, Grade 350W.
- .2 HSS: to ASTM A500, Grade C.
- .3 Tie-Rods:
  - .1 Tie rods shall be 43mm diameter continuously threaded bar with a minimum ultimate tensile capacity of 1001 kN.
  - .2 Tie rods shall meet the requirements of ASTM A615.
  - .3 The minimum yield stress shall be 517 MPa.

- .4 The tie rods shall be continuously threaded bar.
  - .5 The nut shall be capable of developing the full yield capacity of the bar.
  - .6 Welding of tie rods is not acceptable unless approved by a Departmental Representative.
- .4 Threaded Rod: to ASTM A307, Grade A.

## 2.2 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 Welding: in accordance with CSA W59, latest edition.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Steel Piles:
  - .1 All steel piles shall have the tie rod box stiffeners installed prior to the pile installation.
  - .2 The tip of the steel piles shall be trimmed onsite to the required as-built length measured after the casing has been installed and cleaned out.

## 2.3 FINISHES

- .1 The following steel components shall be hot dip galvanizing: to CSA G164, minimum zinc coating of 600 g/m<sup>2</sup>.
  - .1 Holdfast bars.
  - .2 Ladder assemblies.
  - .3 Panel support straps.
  - .4 All threaded rods, anchor rods, and all hardware.
  - .5 All washer plates and nuts.
  - .6 Steel wheel guard assembly.
- .2 The following components shall be black steel:
  - .1 Steel H-Piles.
  - .2 Steel casings.
  - .3 Stiffeners plates welded to the H-Piles.
  - .4 Tie rods and associated nuts.
  - .5 Fabricated tie rod connection box "C-Channel" section.
  - .6 Steel angles installed along the backside of the piles.

**Part 3            Execution**

**3.1                ERECTION**

- .1      Supply components for work by other trades in accordance with shop drawings and schedule.
- .2      Touch-up damaged galvanized surfaces with zinc rich primer.
- .3      Install items as per Contract Drawings / Approved Shop Drawings.
- .4      All embedded anchors shall be installed with an epoxy adhesive which can develop the full strength of the bar. All anchors shall be installed as per the manufacturer's specification.

**3.2                CLEANING**

- .1      Perform cleaning after installation to remove construction and accumulated environmental dirt. All cleaning shall meet the approval of Departmental Representative.
- .2      Upon completion of installation, remove surplus materials, rubbish, tools, and equipment barriers.

**3.3                PROTECTION**

- .1      Protect installed products and components from damage during construction.
- .2      Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**