# 1 GENERAL

## 1.01 DESCRIPTION

.1 The work under this section includes the supply, fabrication and installation of all steel components and HDPE pipe and polystyrene infill, 4 rubber connectors and 16 connection bolts complete with nuts and washers, for each of the floating wharves, including fasteners, miscellaneous bolts, nuts, washers, plates, angles, foot rails, and related metal parts required to complete the work.

## 1.02 RELATED SECTIONS

.1 Section 06 30 00 Treated Dimension Timber.

## 1.03 REFERENCES

.1 American Society for Testing and Materials (ASTM).
- .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
- .2 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 414 MPa Tensile Strength.
- .3 ASTM D2240-15e1, Standard Test Method for Rubber Property – Durometer Hardness.
- .4 ASTM F3125/F3125M-15a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .5 ASTM F2620-13, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

.2 Canadian Standards Association (CSA)
- .1 CSA-G40.20/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steels.
- .2 CAN/CSA-S16-14, Design of Steel Structures.
- .3 CSA-W47.1-09 (2014), Certification of Companies for Fusion Welding of Steel Structures.
- .4 CSA-W48-18, Filler Metals and Allied Metals for Metal Arc Welding.
- .5 CSA-W55.3-08 (R2018), Certification of Companies for Resistance Welding of Steel and Aluminum.
- .6 CSA-W59-18, Welded Steel Construction.

## 1.04 SOURCE QUALITY CONTROL

.1 Supply proof that fabrication shop in which this work is to be constructed is currently certified by the Canadian Welding Bureau to the requirements of the above.

.2 Identify all welding personnel to be used in the fabrication of this work, together with proof of their current welding qualifications and certification under the Canadian Welding Bureau.

.3 Information requested under articles .1 and .2 above is to be supplied with tender documents.

### 1.05 SHOP DRAWINGS

.1 Submit shop drawings and submittals in accordance with Section 01 00 10.

.2 Provide information on all metal, pipe, rubber and polystyrene foam products, and fasteners.

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

.4 Completely detail items indicating all dimensions, thicknesses, gauges of metals and fasteners.

.5 Each shop drawing submittal shall bear the stamp and signature of a qualified Professional Engineer registered in the Province of New Brunswick.

### 1.06 TRANSPORTING, STORAGE AND HANDLING

.1 Exercise care in storing, transporting, handling and erecting all material and support all materials properly at all times so that no piece will be bent, twisted, or otherwise damaged structurally or visually.

.2 Correct damaged material and where damage is deemed irreparable by the Departmental Representative, replace the affected item at no additional expense to the Owner.

.3 Fabricate large assemblies so they can be safely and easily handled to their place of installation in the work.

.4 Store assemblies above ground and so as not to be damaged.

## 2 PRODUCTS

### 2.01 MATERIALS

.1 Steel plate and angles: to CSA-G40.20/G40.21, Grade 350W.

.2 Welding materials: to CSA-W59.

.3 Galvanizing: hot-dipped galvanizing with zinc coating, minimum 600 g/$m^2$ to ASTM-A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.4 Cold applied zinc for touch-up of scratched surfaces: Zinga or approved alternate.

.5 Rubber Units for Inter-float Connectors: 178 mm x 254 mm x 200 mm marine engineered rubber meeting the following fender section minimum performance requirements: Weight: 57.3 kg/m; Reaction: 119 tonne/m; Energy: 4.5 tonne/m; Minimum tensile strength to be 13 MPa, when tested to ASTM-D2240.

.6 Foam: solid polystyrene round foam cylinders that fit snugly inside and fully fill the plastic pipe, or a 2 part expandable foam that will be injected inside the pipe to fully fill the inside cavity. Minimum buoyancy 8.6 kN/$m^3$, (55 lb/$ft^3$).

.7 Smooth High Density Polyethylene (HDPE): to CSA-B182.6.
.1 180 kPa pipe stiffness.
.2 Sewer class.
.3 Fusion (non-gasket) coupling system.
.4 Continuous length as specified on drawings.
.5 Provide purpose-made, 12.7 mm thick end caps, DR17.

## 2.02 BOLTS, NUTS AND WASHERS

.1 Carriage bolts, nuts and washers shall be in accordance with the latest edition of ASTM-A307, unless otherwise indicated or approved.

.2 All bolts for connections of steel framing for the floating wharf module shall be to ASTM-A325.

.3 Carriage bolts shall have round, concave heads.

.4 Structural bolts shall have standard heads.

.5 Structural bolts shall have national coarse thread with allowance for hot-dipped galvanizing.

.6 Structural bolts shall be supplied with heavy duty nuts to ASTM-A563, Grade A, washers to AISI-1010/1020.

.7 When in position, bolts will be of sufficient length to permit a full nut and two washers.

.8 Plate washers shall be to CSA Standard G40.21, minimum 4 mm thick, size as indicated, drilled to suit the bolt diameter with suitable allowance for galvanizing.

## 2.03 FINISHES

.1 Galvanizing: with the exception of stainless steel fabrications and fasteners, all metal fabrications, washers, bolts, etc. shall be hot-dipped galvanized with zinc coating, (600 g/$m^2$).

.2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181, purpose made for field touch-up. To match hot-dip galvanized finish.

## 2.04 FLOATING MODULE IDENTIFICATION

.1 Each wharf module to be provided with raised bead of weld, 50 mm letter height, raised 2 mm, or die-stamped, indicating date of manufacture, and Contractor's float identification number, as directed by Departmental Representative.

.2 Location of lettering to be on exposed surface of one end cross-frame member of each wharf module.

## 2.05 METAL FABRICATION

.1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Fabricate items from steel unless otherwise noted.

.3 Where possible, fit and shop assemble work, ready for installation.

.4 Ensure exposed welds are continuous for length of each joint.

.5 Where not otherwise indicated, all joints to be seal welded with minimum 3 mm continuous welds.

.6 Provide for extra thickness of galvanized bolts when drilling holes in connection plates and framing members.

## 2.06 HEAT FUSION WELDING OF HDPE

.1 All heat fusion welding of the HDPE end caps to the HDPE pipe pontoons shall be performed by an experienced HDPE product manufacturer's certified installer. The HDPE product manufacturer must have written welding and certification guidelines that are the basis for training and certification. All pontoon fabrication and welding shall conform to these guidelines.

.2 Heat fusion welding procedures to be in accordance with ASTM-F2620.

.3 Upon completion of HDPE pipe pontoons construction, conduct pressure test of units to ensure that units are completely

sealed. Provide letter of certification of the pressure test results to Departmental Representative.

## 3 EXECUTION

### 3.01 GENERAL

.1 Do metal fabrication work in accordance with CAN/CSA-S16.

.2 Do 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.

### 3.02 FLOATING WHARF FABRICATION AND ASSEMBLY

.1 Build steel assemblies square, plumb, straight and true, accurately fitted, with tight joints and intersections.

.2 Do steel welding in accordance with CSA-W59 unless specified otherwise.

.3 Floating wharf modules shall be fully assembled in the shop prior to transportation to the site.

.4 Touch-up bolts and scratched galvanized steel surfaces after completion of erection with cold-applied zinc.

### 3.03 INSTALLATION OF CARRIAGE AND MACHINE BOLTS, NUTS AND WASHERS

.1 Countersink bolt heads and washers only where indicated on drawings.

.2 Install plate washers under the heads of all bolts bearing on wood surfaces.

.3 Install lock washers under the nuts of all bolts bearing on steel.

.4 Holes for bolts in wood shall be bored to the same diameter as that of the bolts.

### 3.04 HANDLING GALVANIZED PARTS

.1 Take necessary care in the handling, packing and shipping of all galvanized steel members to prevent damage to the galvanized coating. Evidence of damage to the galvanized members due to mishandling or lack of adequate protection shall be cause for rejection of the damaged members if requested by the Departmental Representative. If not rejected, touch-up galvanized surfaces with cold-applied zinc where damaged.

**END OF SECTION**