

PART 1 - GENERAL

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| 1.1 | <u>Description</u> | .1 | This section specifies the requirements for supplying and placing scour protection at the locations and to the dimensions indicated on the plans. |
| 1.2 | <u>Related Work</u> | .1 | Refer to 01 29 00 - Project Particulars and Measurement. |
| 1.3 | <u>Source of Material</u> | .1 | Inform Departmental Representative at least two weeks prior to commencing work of the location of the source of materials. |
| 1.4 | <u>Measurement For Payment</u> | .1 | Scour protection will be measured in accordance with Section 01 29 00. |
| | | .2 | Transportation of material to the site and any excavation and preparation of the foundation base will not be measured for payment but will be considered incidental to the work. |

PART 2 - MATERIALS

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| 2.1 | <u>Stone</u> | .1 | Random rip rap in accordance with PEI DOTIE Specification Section 213, Class 1, except density shall not be less than 2.65 tonne per cubic metre. Sandstone rock will not be acceptable. |
| | | .2 | Scour Protection: |
| | | .1 | Scour protection will be hard, dense, durable, angular stone, free from cracks or other structural defects. |
| | | .2 | Scour protection to meet the gradation of R5. |
| | | .3 | Fifty percent (50%) by weight of the scour protection shall be individual stones greater than, or equal, to 5 kg. |

PART 3 - EXECUTION

3.1 Placing

.1 Scour Protection:

- .1 Place scour protection as shown on the drawings or as directed by the Departmental Representative.
- .2 Completed scour protection in place shall be a minimum of 300 mm thick.
- .3 Tolerances: 50 mm.

PART 1 - GENERAL

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| 1.1 | <u>Related Requirements</u> | .1 | Section 05 50 00: Metal Fabrications. |
| 1.2 | <u>References</u> | .1 | ASTM A536-84(R2014) Standard Specification for Ductile Iron Castings. |
| | | .2 | ASTM A123/A123M-15, Standard Specification for Zinc (hot-dipped galvanized) Coatings on Iron and Steel Products. |
| | | .3 | CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel. |
| 1.3 | <u>Description</u> | .1 | Design Requirements:
.1 Design bollards and anchor bolts with a minimum factor of safety of 3.0 against failure and to conform to an internationally accepted Standard. |
| 1.4 | <u>Submittals</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submissions/Shop Drawings. |
| | | .2 | Product data: submit manufacturer's printed product literature, specifications and datasheet. |
| | | .3 | Submit shop drawings, indicating following items:
.1 Bollard assemblies, with dimensions as installed on structures.
.2 Anchorage assemblies, with dimensions as installed on structures. |

PART 2 - PRODUCTS

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| 2.1 | <u>Materials</u> | .1 | Bollards: ductile iron casting (spheroidal graphite cast iron) to ASTM A536-84(R2014).
.1 35.0 tonne:
.1 Safe working load: 343 kN. |
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- .2 Bollard fixing hardware: hot dip galvanized as per ASTM A123.
- .2 Grout: shrinkage compensating non-metallic.
- .3 Paint:
 - .1 Supply the bollards with a high performance protective coating system. Protective coating system to consist of blast cleaning, supply and application of an inorganic zinc primer coat, and two (2) or more coats of immersion grade epoxy and the proper curing of the coatings.
 - .2 Surface preparation, application and the dry film thickness (DFT) of each coat to be as recommended by the paint manufacturer. The total DFT of the coating system shall, however, not be less than 350µm (14mils).
 - .3 Supply the complete coating system from the same paint manufacturer and each component of the system must be compatible with the rest of the systems.
 - .4 Colours:
 - .1 Departmental Representative to confirm.

PART 3 - EXECUTION

- 3.1 Application
 - .1 Install bollards in accordance with manufacturer's instructions.
- 3.2 Setting and Grouting
 - .1 Set bollards at locations and elevations as indicated on Project Drawings.
 - .1 After tightening of anchor bolts or positioning wedges, grout under base.
 - .2 Confirm temperatures of concrete, air, base and grout are within range specified by grout manufacturer.
 - .2 Do not grout until location of anchor bolts and bollards have been approved by the Departmental Representative.

PART 1 - GENERAL

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| 1.1 | <u>Description
of Work</u> | .1 | This section specifies requirements for the following items: <ul style="list-style-type: none">.1 Ladders.2 U-bolts.3 Tire Fenders |
| 1.2 | <u>Reference
Standards</u> | .1 | ASTM A48-03(R2012), Gray Iron Castings. |
| | | .2 | ASTM A123-15, Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products. |
| | | .3 | ASTM A307-14, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile. |
| | | .4 | ASTM A391-07(R2012), Standard Specification for Grade 80 Alloy Steel Chain. |
| | | .5 | CAN/CSA-G40.21-13, Structural Quality Steels. |
| 1.3 | <u>Related Work</u> | .1 | Refer to other Specification Sections for related information. |
| | | .2 | Refer to Section 01 33 00 - Submissions/Shop Drawings. |
| 1.4 | <u>Submissions</u> | .1 | Shop Drawings: <ul style="list-style-type: none">.1 Clearly indicate the following items:<ul style="list-style-type: none">.1 General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures..2 Locations, sizes and installation tolerances of anchor bolts, eye bolts and embedded parts..3 Types of materials used, finishes and core thickness..4 All other pertinent details and accessories. |
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- .2 Test Results:
 - .1 Provide test results for the galvanized items.
 - .3 Submissions
 - .1 Provide submissions in accordance with Section 01 33 00.
 - 1.5 Measurement For Payment
 - .1 Ladders, chain, rungs, u-bolts and fasteners will not be measured separately and will be considered incidental to the work.

PART 2 - PRODUCTS

- 2.1 Materials
 - .1 Hardware and miscellaneous items must meet the following specifications:
 - .1 Machine bolts, lag bolts, drift bolts, anchor bolts, nuts, washers to ASTM A307.
 - .2 Steel plates, ladder rungs, holdfasts and miscellaneous steel: to CSA G40.21, Grade 300W.
 - .3 Do not use items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties.
 - .4 Hot dip galvanize chain, bolts, anchor bolts, nuts, washers, pip sleeves, steel plates, rungs, holdfasts U-bolts and any other miscellaneous steel to ASTM A123 with minimum zinc coating of 610 g/m².
 - .5 Existing rubber tires to be in satisfactory condition with no permanent deformity.
 - .6 Chains: 19mm diameter, to ASTM A391, ASTM 80(G30), working load 90 kN.
 - .7 Shackles: 19mm diameter, drop-forged with screw type pin connection.

PART 3 - EXECUTION

- 3.1 Ladders
 - .1 Assemble ladder units and holdfasts and install completed units in locations shown on plan or as indicated by Departmental Representative.

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| 3.2 | <u>U-Bolts</u> | .1 | Install U-bolts as shown on the drawings. |
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| 3.3 | Rubber Tire
<u>Fender</u> | .1 | Existing tire assembly to be re-installed on the Outer East and Center Dolphins to original locations. Confirm locations with the Departmental Representative. |
| | | .2 | Tires to be hung from the brackets with existing chains. Tires to be connected horizontally, vertically and diagonally. Do not cut new holes in tires. |
| | | .3 | Connect each row of tires to the new top brackets. |
| | | .4 | Secure tires to form a level and straight fendering surface. |
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