

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 - Submittal Procedures.
  - .2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
  - .3 Section 01 78 00 - Closeout Submittals.
- 1.2 Measurement Procedures
- .1 See specification Section 01 29 00-Payment Procedures for payment details.
- 1.3 References
- .1 American Society for Testing and Materials (ASTM)
    - .1 ASTM A148/A148M-15a, Standard Specification for Steel Castings, High-Strength, for Structural Purposes.
  - .2 See specification Section 26 42 00-Cathodic Protection for the coating requirements.
- 1.4 Design Requirements
- .1 All new bollards shall be Tee head bollards with a minimum working capacity of 100 Tonnes.
  - .2 All bollards shall be designed for a 3:1 factory of safety.
  - .3 All anchors shall meet the dimensional, depth of embedment and material properties of the manufacturer's specification.
- 1.5 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Indicate following items:
    - .1 Dimensions, clearance locations and direction of assemblies as installed on structures.
    - .2 Locations, sizes and installation tolerances of anchor bolts.

.3 The depth of the proposed recess into the concrete bollard base.

1.6 Closeout Submittals .1 Provide operation and maintenance data for mooring devices for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Include record drawings.

1.7 Waste Management and Disposal .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

## PART 2 - PRODUCTS

2.1 Materials .1 Bollards: Cast steel to ASTM A148/A148M-15a, Standard Specification for Steel Castings, High-Strength, for Structural Purposes.

.2 Other metal parts: structural steel to CSA G40.21.

.3 Bollards: carbon steel casting.

.1 Type: Tee Head Bollard.

.2 Maximum working pull of 100 Tonnes (981 kN).

## PART 3 - EXECUTION

3.1 Workmanship .1 Install in accordance with manufacturer's instructions.

3.2 Setting and Grouting .1 Set all mooring devices at locations and elevations as indicated.

.1 After tightening of anchor bolts or positioning wedges, grout under base.

.2 Ensure that temperatures of foundation, 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 a  
Departmental Representative.

3.3 Acceptance

Acceptance will be considered a minimum line pull  
off of 100 Tonnes at any angle requested by a  
Departmental Representative. The angle must be  
within the working range of the bollard.