

FISHERIES AND OCEANS CANADA
RECONSTRUCTION OF CARLETON'S WHARF

TECHNICAL SPECIFICATIONS FOR TENDER CALL

MECHANICS

SEPTEMBER 2018

By : _____

Stephan Ferrero, Eng.

PART 1 - GENERAL1.1 RELATED
SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3 Section 04 05 12 - Mortar and Masonry Grout.
- .4 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .5 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C900-07, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 Inch through 12 Inch (100 – 300 mm), for Water Transmission and Distribution.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM F 714-10, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
 - .2 ANSI/AWWA C651, Disinfecting Water Mains.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
 - .1 CSA B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
 - .2 CSA B137.3-09, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .5 Bureau de Normalisation du Québec (BNQ)
 - .1 All materials and work procedures are compliant to the the latest version of BNQ 1809-300 - Construction Works - General Specifications - Drinking Water and Sewer Lines. Contractor shall refer to it as the general technical

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document for this project. In the event of any contradiction, the BNQ 1809-300 standards will prevail.

1.3 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS2.1 PIPE, JOINTS AND FITTINGS

- .1 Non-buried pipes:
- .1 Stainless steel pipes, equivalent to those from Douglas Barwick inc. for the surface supply of fresh and salt water.
- .1 Stainless steel pipe.
- Manufacturer: stainless steel piping and accessories described shall be as fabricated by Douglas Barwick inc.
 - Description: 316L stainless steel meeting ASTM A 240 standard requirements.
 - Thickness: Schedule 40
 - Finish: surfaces finish type 1.
- .2 Accessories:
- Stainless steel fittings for grooved joints such as Victaulic series 89.
 - 316L stainless steel elbows, lateral, reducers, tees, unions, etc., with same thickness as equivalent pipe from Victaulic.
 - Valves are specified in drawings.
- .2 Buried pipes
- .1 Potable water pipes (100 mm and 150 mm nominal diameter) are made of DR-11 DIPS PE 4710, butt fused HDPE. The indicated installation slope shall be respected in order to allow the complete pipe draining operation.
- .2 The 50mm pipes may be made of DR-11 butt fused HDPE with an electrofusion saddle or of PEX Bleu904 by IPEX or equivalent. In case of the stainless steel saddle, it needs to be approved for usage on HDPE pipe. The main stop valve shall be entirely made of brass and of the same diameter than the drain pipe. This valve is installed inside the manhole to allow the pipe draining operation. The valve is immediately followed by an elbow (90°) heading to the bottom of the manhole. The operation rod and the lock pin are made of stainless steel. The rod top end has a "T" shape allowing manual operation.

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- .3 When buried, stainless steel pipe sections must be covered with "DENSO" type tape or equal.

2.2 PRECAST VALVE CHAMBERS

- .1 Precast concrete sections to ASTM C 478M. Cast ladder rungs integral with unit; field installation not permitted.
- .2 Jointing materials:
 - .1 Manufacturer's rubber ring gaskets.
 - .2 Mastic joint filler.
 - .3 Mortar Cement.
 - .4 Combination of above types.
- .3 Mortar:
 - .1 Aggregate in accordance with Section 04 05 12 - Mortar and Masonry Grout.
 - .2 Masonry cement to CAN/CSA-A8.
- .4 Ladder rungs for valve chambers: 20 mm diameter non-slip stainless steel bars to CAN/CSA-G30.18. Rungs to be non-slip.
- .5 Manhole diameter are as indicated and to be verified by the contractor. Manhole have inlet and outlet with built-in rubber gasket designed following the pipe material and dimensions.
- .6 Frame, self-level frame and lid for chambers are as following:
 - .1 Conical frame made of gray cast iron : 775 mm diameter, 152 mm height
 - .2 Self level frame made of ductile cast iron : 775 mm diameter, 270mm heigh
 - .3 Lids are made of ductile cast iron: 775 mm diameter, identified « AQUEDUC »

2.3 PIPE BEDDING AND BACKFILL MATERIAL

- .1 Granular material : in compliance to the following requirements.
 - .1 Crushed or screened stone, gravel or sand.
 - .2 Gradations to be within specified limits when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.

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.3 Table

Sieve Designation	% Passing	
Stone/Gravel	Gravel/Sand	
200 mm	-	-
75 mm	-	-
50 mm	-	-
38.1 mm	-	-
25 mm	[100]	-
19 mm	-	-
12.5 mm	[65-90]	[100]
9.5 mm	-	-
4.75 mm	[35-55]	[80-100]
2.00 mm	-	[50- 90]
0.425 mm	[10-25]	[10- 50]
0.180 mm	-	-
0.075 mm	[0- 8]	[0- 10]

- .2 Concrete mixes and materials required for bedding cradles, encasement, supports and thrust blocks: to Section 03 30 00 - Cast-in-Place Concrete.

2.4 BACKFILL MATERIAL

- .1 As indicated, Type 3, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

2.5 PIPE DISINFECTION

- .1 Sodium hypochlorite or Calcium hypochlorite to ANSI/AWWA B300 to disinfect water mains.
- .2 Undertake disinfection of water mains in accordance with BNQ 1809-300.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, and hydrants of accumulated debris and water before installation.
- .1 Inspect for defective material.
- .2 Remove defective material from site as directed by Department's Designated Representative.
- .3 Contractor shall, prior to work beginning, verify all existing and proposed level. Contractor is entirely responsible for the infrastructures implementation on site.
- .4 Contractor shall obtain every underground utilities localisation prior to work realisation.

3.2 TRENCHING

- .1 Dig trenches in accordance with Section 31 23 33.01 -

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Excavating Trenching and Backfilling.

- .2 Dig trenches to a depth depending of the piping slope.
- .3 Trench alignment and depth require Department's Designated Representative's approval prior to placing bedding material and pipe.

3.3 GRANULAR
BEDDING

- .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness.
- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to support joints.
- .5 Compact full width of each layer to a minimum of 95% of the corrected maximum dry density; 95% maximum density to ASTM D 698.

3.4 PIPE
INSTALLATION

- .1 Lay pipes according to manufacturer's recommendations, instructions and specifications prescribed and according to BNQ 1809-300 standards.
- .2 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by the Department's Designated Representative.
- .3 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .4 Recheck pipe joints assembled above ground after placing in trench to ensure that no joint movement has taken place.
- .5 Do not lay pipe on frozen bedding.
- .6 Do hydrostatic and leakage test and have results approved by Department's Designated Representative before backfilling and covering joints and fittings with granular material.
- .7 Backfill remainder of trench.

3.5 INSTALLATION OF
STAINLESS STEEL PIPES

- .1 Install pipes according to specifications and as shown on drawings.

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- .2 Crack detection test:
 - .1 Apply Dubli-Chek penetrating from Weldco on pipe surface and let penetrate for a few minutes.
 - .2 Remove penetrating surplus in surface using a Dubl-Chek solvent.
- .3 Piping alignment:
 - .1 Piping linked with inlets and outlets of equipment or with wall-mounted couplings shall be aligned adequately in order to avoid stress and constraint.

3.6 VALVE CHAMBERS

- .1 Use precast units as approved by the Department's Designated Representative as shown on drawings.
- .2 Install units as indicated, plumb and centered over the valve nut, true to alignment and grade and not resting on pipe.
- .3 Set precast concrete slab on 150 mm of compacted granular bedding minimum. Manholes bedding level shall be adjusted so there is a minimum of 50 mm of free adjustment between the conical frame and the self-level frame
- .4 Plug lifting holes with precast concrete plugs set in mortar cement.
- .5 Install frame and cover on top section to indicated level. If adjustment is required use concrete ring.
- .6 Clean valve chambers of debris and foreign materials; remove fins and sharp projections.

3.7 INSTALLATION OF VALVES

- .1 Install valves to manufacturer's recommendations at locations as indicated.

3.8 THRUST BLOCKS AND RESTRAINED JOINTS

- .1 For thrust blocks: proceed to concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground as indicated or as directed by Department's Designated Representative and Consultant.
- .3 Keep joints and couplings free of concrete.
- .4 Do not backfill over concrete within 24 hours after placing.

	.5	For restrained joints: only use restrained joints approved by Department's Designated Representative.
<u>3.9 HYDROSTATIC AND LEAKAGE TESTING</u>	.1	In accordance with BNQ 1809-300.
<u>3.10 PIPE BACKFILL</u>	.1	Upon completion of pipe laying and after Department's Designated Representative has inspected Work in place, backfill and cover pipes as indicated.
	.2	Hand place backfill material surrounding pipes in uniform layers.
	.3	Place layers uniformly and simultaneously on each side of pipe.
	.4	Do not place material in frozen condition.
<u>3.11 BACKFILL</u>	.1	Place backfill material, above pipe backfill, in uniform layers.
	.2	Do not place backfill in frozen condition.
<u>3.12 FLUSHING AND DISINFECTING</u>	.1	In accordance with BNQ 1309-300
<u>3.13 SURFACE RESTORATION</u>	.1	After installing and backfilling over water mains, restore surface to original condition as directed.

END OF SECTION