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PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This section specifies requirements for the supply of all labour, material and equipment for the construction of water service piping.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- .1 Pipe materials shall be of the following types, Type "K" seamless copper tubing to ASTM B88, Q-Line (PEX-AL-PEX) tubing to CSA B137.10, Municipex (PEXa) tubing to CSA B137.5, blue904 (PEX) tubing to cSA B137.5.
- .2 Q-Line, Municipex and Blue904 tubing shall be blue in colour. All service pipe shall include tracer wire.
- .3 Brass corporation fittings, for Q-Line tubing (main stops, curb stops, couplings, etc,) shall be specifically designed for use with Q-Line tubing and shall meet the requirements for aWWA standard C800.

2.2 BEDDING AND BACKFILL MATERIALS

- .1 Class A bedding material as specified in Section 31 23 33.01 -~C1 Excavation, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.
- .2 Provide proper implements, tools and facilities for the safe and convenient execution of the work.

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3.2 TRENCHING AND BACKFILL

- .1 Do trenching and backfill work to Section 31 23 33.01 -
Excavating, Trenching and Backfilling.

3.3 PIPE LAYING

- .1 Ensure that no foreign matter enter the pipe.
- .2 Firmly and accurately set pipes to line and elevation bedding material to depth indication on drawings.
- .3 No Pipe shall be layed or jointed while trench bottom is frozen or the trench is filled with water.
- .4 Confirm grades and depth. Check profiles.
- .5 Plug pipe ends while laying operations not in progress or prior to backfilling if stub is being buried.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for precast concrete septic tanks.

1.2 RELATED SECTIONS

- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 31 05 16 - Aggregate Materials.
- .5 Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .6 Section 33 36 33 - Utility Drainage Fields

1.3 REFERENCES

- .7 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .8 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .9 Canadian Standards Association, (CSA International)
 - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CAN/CSA-A23.4/A251, Precast Concrete-Materials and Construction/Qualification Code for Architectural and Structural Precast Concrete Products.
 - .3 CAN/CSA-B66, Prefabricated Septic Tanks and Sewage Holding Tanks.
 - .4 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).

1.4 DESIGN REQUIREMENTS

- .10 Design precast concrete septic tank in accordance with CAN/CSA-B66, and to carry handling stresses and indicated service loads.
- .11 Tank to have minimum total working capacity as indicated.

1.5 SUBMITTALS

- .12 Shop drawings to indicate:
 - .1 Design calculations for items designed by manufacturer.
 - .2 Tables and bending diagrams of reinforcing steel.
 - .3 Camber.
 - .4 Formwork.
 - .5 Finishing schedules.
 - .6 Methods of handling and erection.
 - .7 Storage facilities.
 - .8 Openings, sleeves, inserts and related reinforcement.

1.6 QUALIFICATIONS

- .13 Manufacturers and erectors of precast concrete elements shall be certified by CSA as meeting requirements of CAN/CSA-A23.4/A251, for Category SC and SP products.

PART 2 - PRODUCTS

2.1 CONCRETE MIXES AND MATERIALS

- .14 Concrete mixes and materials: to CAN/CSA-B66 and CAN/CSA-A23.1/A23.2.
- .15 Use type 10 cement.

2.2 MANUFACTURE

- .16 Manufacture units in accordance with CAN/CSA-A23.4/A251, except where specified otherwise. Piping as indicated on drawings.

2.3 FINISHES

- .17 Finish tanks to commercial grade to CAN/CSA-A23.4/A251.

2.4 SIPHON CHAMBER

- .18 Siphon chamber to meet design requirements specified for septic tanks.
- .19 Provide siphon chamber vents.

2.5 ACCESS

- .20 Provide access holes to surface to facilitate cleaning inspection.

2.6 TANK BEDDING AND SURROUND MATERIAL

- .21 Granular material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3	Table	
	Sieve Designation	% Passing
	200 mm	-
	75 mm	-
	50 mm	-
	37.5 mm	-
	25 mm	-
	19 mm	-
	12.5 mm	100
	9.5 mm	-
	4.75 mm	80-100
	2.00 mm	50- 90
	0.425 mm	10- 50
	0.180 mm	-
	0.075 mm	0- 10

2.7 BACKFILL MATERIAL

.22 As indicated.

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

2.8 MODULAR WALL SEALS

.24 Provide modular wall seals.

2.9 EFFLUENT FILTER

.25 Consists of primary and secondary filter to permit removal of primary filter for servicing. Filter material to be non-corrosive PVC, ABS and polyethylene.

.26 Filter container complete with primary and secondary pull rods, inlet and outlet, leg bosses to accept either NPS 32 mm or 38 mm SCH 40 PVC pipe and septic tank riser with cover.

.27 Capacity: filter area, slot diameter and flow rate as indicated.

.28 Filters manifold together as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

.29 Place bedding and surround material in unfrozen condition.

.30 Do excavation in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.31 Place tank bedding material in accordance with details as indicated. Compact to 95% maximum dry density to ASTM D698.

.32 Make inlet and outlet joints of septic tank watertight, using modular wall seals.

- .33 Conduct leakage test on septic tank in presence of Owner's Representative, before backfilling. Fill tank to level of effluent pipe, and allow to stand for 24 hours. Allowable leakage is zero.
- .34 Do backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .1 Compact to 90% maximum dry density to ASTM D698.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation for trench type septic tank disposal fields.

1.2 RELATED SECTIONS

- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 31 05 16 - Aggregate Materials.
- .5 Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .6 Section 33 36 00 - Utility Septic Tanks.

1.3 REFERENCES

- .7 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422, Standard Method for Particle-Size Analysis of Soils.
 - .4 ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .8 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .9 Canadian Standards Association (CSA International)
 - .1 CSA B1800, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).

1.4 SUBMITTALS

- .10 Submit to Owner's Representative 20 kg samples of granular materials at least 4 weeks prior to beginning Work.
- .11 Submit to Owner's Representative copy of certification or licence of approved installers.

1.5 QUALITY ASSURANCE

- .12 Use certified, licenced installers who comply with local authority having jurisdiction.

PART 2 - PRODUCTS

2.1 GRANULAR MATERIALS

- .13 Granular material to Section 31 05 16 - Aggregate Materials and following requirements:

.1	Pit run crushed or screened stone, gravel or sand.		
.2	Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.		
.3	Table		
	Sieve	% Passing	
	Designation	Sand	Stone
	200 mm	-	-
	75 mm	-	-
	50 mm	-	-
	38.1 mm	-	-
	25 mm	-	80-100
	19 mm	-	0-5
	12.5 mm	100	-
	9.5 mm	-	-
	4.75 mm	80-100	-
	2.00 mm	50-90	-
	0.425 mm	10-50	-
	0.180 mm	-	-
	0.075 mm	0-5	-

2.2 IMPORTED FILTER MATERIAL

- .14 Washed stone conforming to requirements of local authority having jurisdiction.

2.3 PIPE FOR DISPOSAL FIELDS

- .15 Straight PVC pipe and fittings to CAN/CSA-B182.2. Perforated or unperforated as indicated.

2.4 DISTRIBUTION BOX

- .16 Concrete: as indicated and to Section 33 36 00 - Utility Septic Tanks.

2.5 SOURCE QUALITY CONTROL

- .17 If requested, provide Owner's Representative with 3 certified copies of factory tests of pipe material.

PART 3 - EXECUTION

3.1 TRENCH TYPE DISPOSAL FIELD INSTALLATION

- .18 Excavate to lines and depths as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .19 Scarify trench base and walls under dry conditions.
- .20 Obtain Owner's Representative approval to operate construction equipment across disposal field.
- .21 Place minimum 150 mm of stone material in bottom of trench.
- .22 Install distribution box between septic tank and absorption trenches. Installation to be water-tight construction.
- .23 Distribution box: set level as indicated. Provide access with removable cover for inspection of distribution box.
- .24 Connect lengths and place distribution pipe on stone material as indicated and cover with minimum 50 mm of stone material.
- .25 Connect each distribution pipe individually to distribution box.
- .26 Cap or plug free ends of distribution lines.
- .27 Maintain pipe elevations within 5 mm of inverts indicated.
- .28 Do not backfill trenches until pipe grade and alignment have been approved by Owner's Representative and authority having jurisdiction.
- .29 Backfill trenching with material as indicated. Material to be approved by Owner's Representative. Do not compact. Overfill to allow for settlement.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 This section specifies requirements for the supply of all labour, material and equipment for the construction of culverts.

PART 2 - PRODUCTS

2.1 PIPE

- .1 Concrete pipe shall be reinforced and concrete to ASTM C76.

2.2 BEDDING AND BACKFILL MATERIALS

- .1 Class A bedding material as specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Backfill material specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes of accumulated debris and water before installation. Carefully inspect materials for defect. Remove defective materials from site.
- .2 Provide proper implements, tools and facilities for the safe and convenient execution of the work.

3.2 TRENCHING AND BACKFILL

- .1 Do trenching and backfill work to Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.3 PIPE LAYING

- .1 Carefully lower the pipe into the trench. Do not drop or dump materials.
 - .2 Firmly and accurately set pipes to line and elevation bedding material to depth indication on drawings.
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.3 Confirm grades and depth. Check profiles.

PART 1 - GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

PART 2 - PRODUCTS

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: Type DB2/ES2, with fittings, for direct burial expanded flange ends.
 - .1 Nominal length: 6 or 3 m plus or minus 12 mm.
- .2 Rigid PVC split ducts.
- .3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make a complete installation.
- .4 Rigid PVC 90 degrees, 45 degrees bends and 5 degrees angle couplings, as required.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

- .1 Per manufacturers requirements.

2.4 WARNING TAPE

- .1 Standard 4-mil polyethylene 76 mm wide tape, yellow with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW".

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Complete installation of underground cable ducts in accordance with NB Power Standard Construction Practices for Underground.
- .2 Clean inside of ducts before laying.
- .3 Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
- .6 Pull through each duct steel or wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.

- .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
- .8 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
- .9 Install markers as required.
- .10 Notify the Consultant for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

3.2 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION