



Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work described herein shall consist of the construction of a wetwell as shown on the Plans and in accordance with Section 01 00 10, Special Provisions including: the supply and installation of a precast reinforced concrete special manhole; the supply and installation of piping, valves, fittings and related appurtenances; the supply and installation of miscellaneous metal; the supply and installation of pumping equipment; the supply and installation of electrical equipment; the supply and installation of insulation; the connection of the electrical equipment to the source of power; the sanding, priming and painting of all uncoated non-galvanized iron and steel products; the connection of the wetwell to the water intake line and to the discharge pipeline and testing the completed wetwell.

1.2 STANDARDS

The following organizations publish Standards which have been referred to in this Section:

- .1 CSA International
178 Rexdale Boulevard,
Etobicoke, ON M9W 1R3
- .2 ASTM – American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959 USA
- .3 AWWA - American Water Works Association
6666W. Quincy Avenue
Denver, Colorado
- .4 CGSB – Canadian General Standards Board
Place Du Portage 111, 6B1
11 Laurier Street
Gatineau, QC K1A 1G6

The Standards referred to shall be the most recent edition.

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1.3 QUALITY ASSURANCE

- .1 **CONCRETE** - The Engineer shall carry out tests on concrete as he considers necessary, in accordance with the current CSA Standard A23.2, Methods of Test for Concrete. Such tests shall be at the expense of the Owner, except that the Contractor shall furnish any and all test samples free of charge.
- .2 **LEAKAGE** – the Contractor shall undertake infiltration and exfiltration testing of the completed wetwell to ensure the manhole is watertight.
- .3 **OPERATION** - The Contractor and the suppliers of major pumping and control components shall test the operation of the wetwell under the direct supervision of the Engineer.
- .4 **WELDED JOINTS** – The Contractor shall supply a procedure for welded joints to the Engineer. The Engineer may test welded joints by x-raying or other means. If the welds are deemed to be faulty the costs to fix the welds shall be the responsibility of the Contractor. Welders shall hold a valid "Welder's Licence" in the Province of Manitoba and be certified by Provincial Regulator.
- .5 **GROOVED JOINTS** – All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.

All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.

1.4 STORAGE AND HANDLING

- .1 Pumps, pipe, fittings, concrete manhole and other materials associated with the construction of the wetwell shall be stored and handled in accordance with the recommendations of the Manufacturer and in a manner approved by the Engineer.

1.5 INSPECTION

- .1 Inspection of the work described in this Section shall be performed by the Engineer.

Part 2 PRODUCTS

2.1 APPROVED PRODUCTS

- .1 Products shall be supplied in accordance with the Listing of Approved Products in the attached Appendix or as shown on the plans or specified in Section 01 00 10, Special Provisions.

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2.2 WETWELL STRUCTURE

- .1 Unless shown otherwise on the Plans or specified in Section 01 00 10, Special Provisions, the wetwell structure shall be a precast reinforced concrete manhole conforming to the current ASTM C478, Standard for Precast Reinforced Concrete Manhole Section, complete with precast reinforced base, stainless steel or fibreglass mesh working floor and top slabs, each designed for 700 kg live load, with cast-in-place stainless steel, painted steel, painted steel, composite or aluminium access hatch frames and covers; tongue and groove manhole section joints with deformable bituminous gaskets ("Ram-nek" or approved equal) cast-in-place openings as required; and stainless steel or aluminium rungs. Grab bars shall be stainless steel anchored to the top with type 316 stainless steel anchor bolts.

2.3 FIBREGLASS MESH WORKING FLOOR

- .1 The fibreglass mesh working floor (if specified) shall be a Vinyl Ester based non skid fibreglass mesh system with a Class 1 ASTM E-84 flame spread rating of 25 or less. The system shall be designed to limit deflection to L/240. Mesh spacing shall be 38 x 38 mm x 38 mm thick. The system shall be complete with all stainless steel clips, wide flange I beam supports (150 mm flange, 9 mm thick web) and stainless steel fasteners required to construct a complete working floor as shown on the Plans and specified in Section 01 00 10, Special Provisions.

2.4 CONCRETE GROUT

- .1 Concrete grout shall be non shrink type in accordance with Clause 2.7.6 of Section 03 30 00; Cast- In -Place Concrete or as specified in Section 01 00 10, Special Provisions.

2.5 PIPE AND FITTINGS

- .1 Pipe, tees, elbows, reducers, sleeves and related fittings shall be iron conforming to current AWWA Standards C110 for Gray and Ductile Iron Fittings and C115 for Flanged Cast and Ductile Iron Pipe, or seamless black steel, ASTM Type A53 Grade B with either integral flanges or bevelled ends suitable for slip on flanges or for use with Polyvinyl Chloride pipe Schedule 80 or Stainless Steel Schedule 10 pipe and fittings as per Section 15 05 00, Basic Materials and Methods or as shown on the plans and as specified in Section 01001, Special Provisions. Flanges for steel shall be suitable for 1000 kPa service, forged steel, flat-face type, drilled, conforming to the current AWWA Specification C207, Standard for Steel Pipe Flanges. Gaskets shall be full faced and drilled, red rubber type or approved equal. Nuts bolts and washers shall be Type 316, all stainless steel with hexagonal heads.

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.2 Grooved Joint Fittings:

.1 Grooved joint fittings for Class 53 (min) ductile iron pipe shall comply with AWWA Standard C606 for grooved and shouldered ends. Fittings shall comply with ANSI A21.10/AWWA C110 for center-to-end dimensions, and ANSI A21.10/AWWA C110 or AWWA C153 for wall thickness.

.2 Grooved joint fittings for steel piping systems shall be ductile iron to ASTM A-536, wrought steel to ASTM A-234, or factory-fabricated from ASTM A-53 steel pipe.

2.6 PUMPS

.1 Pumps shall be as described in Section 01 00 10, Special Provisions.

2.7 BUTTERFLY VALVES

.1 Butterfly valves shall be grooved end or wafer-style, suitable for 2065 kPa cold-water service, with cast ductile iron body, bronze or stainless steel disc stem, one piece shaft, EPDM seat (pressure responsive seat in sizes through NPS 12) and seals. Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating. The butterfly valve installed on the intake line shall be complete with a heavy duty gear operator packed with non-toxic waterproof grease suitable for potable water use, an extension spindle of adequate length to extend one metre above the working floor level, and an operating wheel. All other butterfly valves shall have manual operating levers.

2.8 CHECK VALVES

.1 Check valves shall be silent type for 1575 kPa cold-water service suitable for use with flanged or grooved connections.

2.9 MISCELLANEOUS METAL

.1 PIPE SUPPORT STRAPS - shall be all stainless steel with Type 316 all stainless steel nuts, bolts, and washers.

.2 VENTILATION PIPING - shall be seamless stainless steel thin wall pipe with light gauge welded fittings or stainless steel schedule 10.

.3 ACCESS HATCH – shall be a stainless steel, painted steel, composite or aluminium hinged frame with a continuous EPDM gasket and lockable cover unit as shown on the Plans and described in Section 01 00 10, Special Provisions.

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2.10 ELETRICAL

- .1 Electrical products shall conform to Section 26 01 00, Electrical Work Part 2 and as shown on the plans and specified in Section 01 00 10 of the Special Provisions.

2.11 CONNECTIONS TO LINES

- .1 INTAKE LINE - The intake line shall be a polyethylene pipe with a flange assembly (stub end and drilled epoxy coated ductile iron backup ring). All stainless steel Type 316 nuts, bolts and washers with a full faced red rubber gasket shall be used to join the intake line flange assembly to the flanged steel pipe extending into the wetwell.
- .2 DISCHARGE LINE - Suitable flexible couplings approved by the Engineer shall be used to connect the discharge pipe to the flanged steel discharge pipe extending beyond the wetwell wall. If the discharge pipeline is polyethylene, the connection products shall be as detailed above under Clause 2.11.1, "INTAKE LINE".

2.12 INSULATION

- .1 Insulation on exterior or interior of the wetwell shall be 50 mm thick polystyrene in conformance with CAN/ULC 5701 or CGSB-51-GP-20 m type 4 or approved equal and shall be fastened in accordance with the manufacturer's recommendations or as shown on the Plans.

2.13 PRIMER AND PAINT

- .1 Primer and paint shall be chemical-resistant grade enamel as shown on the Plans and specified in Section 00 10 01, Special Provisions. Paint colour shall be medium blue or green enamel or as otherwise specified on the Plans or in Section 00 10 01, Special Provisions.

2.14 DEWATERING SITE

- .1 Provide all pumping equipment and/or necessary drainage works to allow for construction to proceed.

Part 3 EXECUTION

3.1 EXCAVATION, BACKFILL AND COMPACTION

- .1 The installation of the precast concrete manhole shall be undertaken in accordance, with Section 02 21 90, Structural Excavation, Backfill and Compaction, Section 02 21 80 Pipe Excavation Bedding and Backfill, Section 02

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70 30, Sewers and as shown on the Plans and specified in Section 01 00 10, Special Provisions.

3.2 ALIGNMENT AND GRADE

- .1 The wetwell shall be constructed to the alignment and grade as shown on the Plans and as staked on the ground by the Engineer.

3.3 LIFTING EQUIPMENT

- .1 Lifting equipment of adequate capacity shall be used to place the precast wetwell slabs and sections.

3.4 JOINING SECTIONS

- .1 All precast concrete slabs and sections shall be sealed with a deformable bituminous gasket, Ram-nek or approved equal. The sections and slabs shall be joined such that ladder rungs line up vertically and align properly with the access hatch or frame and cover units. All joints shall be grouted in the interior and on the exterior of the wetwell with approved non shrink concrete grout. Fibreglass mesh or stainless steel working floor systems shall be installed in accordance with the manufacturer's recommendations and as shown on the Plans.

3.5 GROUTING

- .1 All holes, joints, pipes and conduits passing through the wetwell walls and slabs shall be grouted both on the interior and exterior of the wetwell with approved non shrink concrete grout as per Section 03 30 00; Cast- in-Place Concrete.

3.6 CUTTING PIPE

- .1 Pipe shall be cut to the correct lengths and the ends shall be bevelled to be compatible for welding on slip-on flanges.

3.7 WELDING

- .1 Welding of pipe and fittings shall conform to the current AWWA C206, Standard for Field Welding of Steel Water Pipe.

3.8 JOINING PIPE AND FITTINGS

- .1 All flanged pipe, valves and fittings shall be bolted together with a rubber gasket between the flange faces. Nuts, bolts and washers joining pipe shall be all Type 316 stainless steel.

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- .2 Grooved Joints: Install in accordance with the manufacturer's latest published installation instructions. Pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to (and including) groove. Gasket shall be manufactured by the coupling manufacturer and verified as suitable for the intended service. A factory trained representative (direct employee) of the coupling manufacturer shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and product installation. The representative shall periodically visit the job site and review installation to ensure best practices in grooved joint installation are being followed. Contractor shall remove and replace any improperly installed products.

3.9 PAINTING

- .1 All uncoated non-galvanized iron and steel products installed in the wetwell shall be sanded clean, such that all rust is removed, primed with a single coat of chemical-resistant primer and painted with two coats of chemical resistant enamel as shown on the Plans and specified in Section 01 00 10, Special Provisions.
- .2 Stainless steel products do not require priming or painting.

3.10 DISCHARGE CONNECTION

- .1 The discharge pipeline shall be connected to the flanged discharge pipe as described herein or as shown on the Plans and specified in Section 01 00 10, Special Provisions.

3.11 ELECTRICAL

- .1 Installation of electrical products shall conform to the requirements of Section 26 01 00, Electrical Work Part 3, and as shown on the Plans or specified in Section 01 01 10, Special Provisions, and the Manitoba Electrical Code.

3.12 INSULATION

- .1 Insulation shall be fastened in accordance with the manufacturer's recommendations and as shown on the Plans and described in Section 01 00 10, Special Provisions.

3.13 TESTING

- .1 The completed wetwell shall be tested. The intake line valve shall be opened, and the Engineer shall record the time required for the wetwell to fill with water and the static elevation of the water level when the wetwell is full. The pumps shall be tested by operating them individually to meet the specified performance

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requirements. The Engineer shall simultaneously record the discharge rate and pressure at the discharge point of the pipeline.

- .2 Prior to starting the test the water level in the wetwell shall be maintained for 48 hours to permit absorption by the concrete.
- .3 Thereafter the valve on the intake shall be closed. The Engineer shall record the water level and record it again after an eight hour period. Any leakage shall be noted and remedial action shall be taken. The internal piping of the wetwell shall be tested at a pressure of 1000 kPa for a period of two hours. Any leakage or loss of pressure shall be noted and remedial action shall be taken. The tests shall be repeated until all defects are eliminated to the satisfaction of the Engineer. Any defects shall be corrected by the Contractor at his own expense.

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