

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 05 16 – Aggregate Materials.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 Bureau de normalisation du Québec (BNQ)
 - .1 BNQ 1809-300/2004(R2007) M2-2015 – “*Travaux de construction – Clauses techniques générales – Conduites d’eau potable et d’égout*” (construction work – general technical clauses – potable water conduits and sewers).
- .2 Canadian Standard Association (CSA)
 - .1 CSA B137.3-13 - Thermoplastic Pressure Piping Compendium.
- .3 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A252-10 – Standard Specification for Welded and Seamless Steel Pipe Piles.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required shop drawings in accordance with section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for distribution piping materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Pipe certification to be on pipe.

1.4 CLOSEOUT SUBMITTALS

- .1 Supply the data necessary to produce drawings of the finished works, including directions for operating valves, list of equipment required to operate valves, details of pipe material, location of air and vacuum release valves, hydrant details.
 - .1 Data must include the elevation of the summit of pipes, the type of connections and their location on the horizontal plane.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off the ground in accordance with manufacturer's recommendations in a clean, dry, well-ventilated area.

- .2 Store and protect water distribution piping from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

1.6 INTERRUPTION TO EXISTING SERVICES

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Departmental Representative.
- .3 Notify Departmental Representative minimum of 2 weeks in advance of interruption in service.
- .4 Unless otherwise specified, do not interrupt water service for more than 3 consecutive hours. Interruptions are allowed only at the times specified by the Departmental Representative.
- .5 Notify fire department of planned or accidental interruption of water supply to hydrants.
- .6 Provide and post "Out of Service" sign on hydrant not in use.

Part 2 Products

2.1 PIPE, JOINTS AND FITTINGS

- .1 Main
 - .1 Polyvinylchloride (PVC) piping for conveyance under pressure: Compliant with BNQ 1809-300 Standard, class 150, DR18, bell-and-spigot pipe with waterproof seal.
- .2 Piping protected by a sheath
 - .1 Polyvinylchloride (PVC) piping for conveyance under pressure: Compliant with BNQ 1809-300 Standard, class 150, DR18, with bell-and-spigot pipe with waterproof seal, fusible piping.
- .3 Raw water conduit (well to plant)
 - .1 Polyvinylchloride (PVC) piping for conveyance under pressure: compliant with CSA Standard B137.3, series 160, DR26, with bell-and-spigot pipe with waterproof seal.
- .4 Connection line to well
 - .1 Cross-linked polyethylene piping (PEX): compliant with BNQ 1809-300.
- .5 PVC connector
 - .1 Same class as the piping or better.

2.2 VALVES AND CURB BOXES

- .1 Valves must open counter-clockwise.
- .2 Gate valves: Compliant with BNQ 1809-300 Standard, wedge seated, standard iron body, bronze-mounted, with type 304 bolted stainless steel joints, internal and external epoxy coating for a minimum operating pressure of 220 psi.

- .3 Underground valves must be installed at the stated places.
- .4 Curb boxes: BNQ 1809-300 compliant, type 2, of cast iron with adjustable extension when in a flexible pavement.

2.3 SERVICE CONNECTIONS (WELLS)

- .1 Connection lines to PVC pipes
 - .1 Connection lines of less than 100 mm diameter: Corporation cock mounted on a threaded outlet, with stainless steel seat consisting of a circular band with lateral teeth and splines, a restraining pin, bolts, nuts, washers and seals. Compression-type stop valve in bronze, without drain, compliant with BNQ 1809-300 and curb box compliant with BNQ 1809-300.

2.4 FIRE HYDRANTS

- .1 Post-type fire hydrant: Compression-type hydrants compliant with BNQ 1809-300, consisting of a 150-mm diameter body fitted with two (2) threaded 65-mm diameter hose outlets, with 100-mm Storz fire-hose connector. The post is fitted with a drain device.
 - .1 Bury depth must be 2 m.
 - .2 A 20-mm clean stone pit with a volume of 1 m³ must be provided to drain the fire hydrant.
- .2 Finish coating: Yellow exterior enamel paint.
- .3 150-mm diameter connection pipe with valve.

2.5 RESTRAINING SYSTEM

- .1 Restraining systems for PVC pipes must be of the collar type and in compliance with BNQ 1809-300.

2.6 STEEL SHEATHS

- .1 Sheath must be made up of steel tubes meeting ASTM Standard A-252, grade 2, having an elastic limit of 240 MPa, and minimum wall thickness of 4.8 mm.
- .2 The sheath may not be more than 200 mm wider than the pipe that it protects.
- .3 The pipe inside the sheath must be held against the walls of the sheath by means of side rails.
- .4 Waterproof sleeves are installed at the ends of the sheath.
- .5 The pipe inserted into the sheath must be of the type having fused joints.
- .6 The aggregate bedding and covering of the sheath must comply with standard BNQ 1809-300.

2.7 BEDDING AND COVERING MATERIALS

- .1 MG20 aggregates: Compliant with section 31 05 16 – Aggregate Materials.

- .2 The thickness and extent of bedding and covering materials must comply with standard BNQ 1809-300.

2.8 BACKFILLING MATERIALS

- .1 Backfilling materials: Class B, in accordance with section 31 23 33.01 – Excavating, Trenching and Backfilling.

2.9 CATHODIC PROTECTION

- .1 Sacrificial zinc anodes are installed on all water main valves, and all connections, bends, and cast-iron T-shape iron castings, as well as all connection lines, fire hydrants and restraining collars that are not connected to a cast-iron part.
- .2 The dimensions and weights of anodes are indicated on the drawings.
- .3 Anodes are connected to copper connection lines with a grounding collar.
- .4 Anodes are connected to the cast-iron parts by aluminothermic welding.

2.10 TRACING WIRE

- .1 RWU-90-X-LINK-40C copper tracing wire gauge #6 is installed above PVC water pipes.
- .2 The tracing wire is attached to the fire hydrant by a grounding collar.
- .3 The wire is attached to water pipes every 3 m using plastic, wire, or other fastenings.
- .4 Wires are joined using connectors suitable for electrical connections.
- .5 The tracing wire is installed as shown on the drawings.
- .6 For the raw water conduit connecting the well to the plant, connect the tracing wire to a metal rod planted on surface, at the ends of the pipe.

Part 3 Execution

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.

3.2 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Ensure trench depth allows coverage over pipe of 2.0 m minimum from finished grade.
- .3 Trench alignment and depth require Departmental Representative's approval prior to placing bedding material and pipe.

3.3 CONCRETE BEDDING AND ENCASEMENT

- .1 Do concrete work in accordance with BNQ Standard 1809-300.
- .2 Place pipes in accordance with the requirements of BNQ Standard 1809-300 and the manufacturer's recommendations.
- .3 Connect pipes in accordance with the requirements of BNQ Standard 1809-300 and the manufacturer's recommendations.
- .4 Keep joints and pipe interiors free of water, debris and other foreign bodies.
 - .1 If the work is interrupted, place a movable waterproof barrier at the free end of the section installed in order to prevent the entry of foreign bodies.
- .5 Backfill the rest of the trench.

3.4 INSTALLATION OF VALVING DEVICES

- .1 Install valving devices in accordance with BNQ Standard 1809-300.

3.5 SHEATH

- .1 Dig trenches in accordance with section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .2 Place aggregate bedding MG-20, coating and covering in accordance with BNQ Standard 1809-300.
- .3 Position the protective pipe in accordance with the indicated lines and level.
- .4 Insert the pipe to be protected with wedges.
- .5 Seal the ends of the sheath in waterproof fashion.
- .6 Backfill the trench.

3.6 WATER CONNECTIONS

- .1 Bring building connection piping to 1 m from the outside wall of the building foundation, in line with the connection point to the main pipe.
 - .1 Install the connector sleeve required to connect to the building's water system.
 - .2 If the building's water system is already in place, make the connection, otherwise stop and seal the end of the waiting connecting pipe, then place a temporary marker. Make the connection once the building's water system is in place, after compliant testing of the system.
- .2 Carry out the work in accordance with the prescriptions of BNQ Standard 1809-300.
- .3 For connections to a PVC pipe, use service saddles.

- .4 A connection shutoff valve in a connection curb box must be mounted on connections whose nominal diameter is 50 mm or less.
 - .1 Connections with a larger diameter must be fitted with a gate valve housed in a cast-iron curb box.
 - .2 Position the curb box plumb above the valve so that the top is flush with the definitive ground level.
 - .3 Leave the connection shutoff valves completely closed.

3.7 HYDRANTS

- .1 Install hydrants at locations as indicated.
- .2 Install hydrants in accordance with BNQ Standard 1809-300.
- .3 Install 150 mm gate valve on hydrant service leads as indicated.
- .4 Set hydrants plumb, with hose outlets parallel with edge of pavement or curb line, with pumper connection facing roadway and with body flange set at elevation of 50 mm above final grade.
- .5 Place concrete thrust blocks in accordance with the requirements of NQ Standard 1809-300.
- .6 To provide proper draining for each hydrant, excavate pit measuring not less than 1 m³ deep and backfill with crushed clean 20 mm stone to level 150 mm above drain holes.
- .7 Place appropriate sign on installed hydrants indicating whether or not they are in service during construction.

3.8 THRUST BLOCKS AND RESTRAINED JOINTS

- .1 As stipulated in NQ Standard 1809-300, joints must be restrained on either side of all accessories (bends, valves, T-fittings, sleeves and others) and fire hydrants by a restraining system along a length specified in the standards.
- .2 Do not pour concrete on connection joints and sleeves.

3.9 HYDROSTATIC AND LEAKAGE TESTING

- .1 Carry out tests in accordance with BNQ Standard 1809-300.
- .2 Notify Departmental Representative at least 24 hours in advance of proposed tests.
 - .1 Perform tests in presence of Departmental Representative.
- .3 Carry out testing section by section (from one valve to the next).
- .4 When testing is done during freezing weather, protect hydrants, valves, joints and fittings from freezing.
- .5 The hourly leakage rate must not exceed the allowable limit according to NQ Standard 1809-300.
- .6 Locate and repair defects if leakage is greater than amount specified.
- .7 Repeat test until leakage is within specified allowance for full length of water main and connections.
- .8 The contractor must submit a certified report of results.

3.10 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations: under direct control of Departmental Representative.
 - .1 Notify Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will begin.
- .2 Flushing and disinfection work must be performed in accordance with NQ Standard 1809-300.
- .3 As needed, supply and install the pumps and connections necessary for flushing.
- .4 Open the fire hydrants, cocks and valves of the water main and connections in order to ensure thorough flushing. Re-close them once the operation has been completed.
- .5 Disinfection work must be carried out by a specialist contractor.
- .6 The specialist contractor must submit a certified copy of analysis results.

3.11 SURFACE RESTORATION

- .1 After installing and backfilling over water mains, restore surface to original condition. Provide the removal and re-installation of signage panels, fences and other equipment in conflict with the proposed works.

3.12 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 05 16 – Aggregate Materials.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 *Bureau de normalisation du Québec (BNQ)*
 - .1 BNQ 1809-300/2004 (R2007) M2-2015 – “*Travaux de construction – Clauses techniques générales – Conduites d’eau potable et d’égout*” (construction work – general technical clauses – drinking water and sewer pipes).
 - .2 BNQ 2622-420/2009 – “*Regards d’égout, puisards, chambres de vanne et postes de pompage préfabriqués en béton armé*” (manholes, catch basins, valve chambers and precast reinforced concrete pumping stations).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule work such as to minimize interruptions to existing services and maintain existing flow during construction. Provide for required pumping. Service stoppages are not authorized.
 - .2 Submit the schedule of planned interruptions for approval and adhere to the approved schedule.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the requested action/informational submittals in accordance with section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
 - .1 Certification to be marked on pipe.
- .4 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 PLASTIC PIPE

- .1 Polyvinylchloride (PVC) pipes compliant with BNQ 1809-300, Class DR35 or DR28 (150 mm or less) with watertight seal.

2.2 PRECAST MANHOLES

- .1 Precast concrete manholes compliant with BNQ Standard 2622-420. The manufacturer must have a BNQ compliance certificate.
- .2 Sewer manholes are fitted with a trickle channel that is equal to the semi-diameter of the connected conduit.
- .3 Steps must be of galvanized steel and comply with BNQ 2622-420 Standard .
- .4 Manhole joints must be waterproof.

2.3 FRAMES, COVERS AND FRAME RISER

- .1 Parts for frames and covers must comply with BNQ Standard 1809-300.
- .2 All manholes must be fitted with a safety grate resting on the frame. The safety grate is of galvanized steel and 692 mm in diameter.
- .3 In rigid pavement or off-roadway, the contractor shall install a standard frame with a cover 775 mm in diameter.
- .4 In flexible pavement, the contractor shall supply and install a guide frame, a self-levelling frame and a cover 775 mm in diameter.
- .5 Covers must be marked "*Égout sanitaire*" (sanitary sewer).

2.4 CONNECTIONS

- .1 Pipes for connections are in polyvinyl chloride (PVC) compliant with BNQ 1809-300 Standard, Class DR35 for diameters of 200 mm or more and DR28 for diameters of less than 200 mm.
- .2 Connections to the sewer are made with a PVC connection of the same class as the main sewer pipe. Connections to new TBA pipes 750 mm diameter or less are made using monolithic tees, in accordance with article 10.5.12 of the BNQ 1809-300 Standard.
 - .1 Universal saddles are prohibited.

2.5 PIPE BEDDING AND SURROUND MATERIALS

- .1 Granular material of type MG-20 as per Section 31 05 16 - Aggregate Materials.

2.6 BACKFILL MATERIAL

- .1 Backfill materials: class B or excavation material in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling, up to the level of the pavement infrastructure or final level.

Part 3 Execution

3.1 PREPARATORY WORKS

- .1 Set up temporary means of erosion and sediments control in accordance with section 01 57 13 – Temporary Erosion and Sediments Control.
- .2 Set up the required temporary pumping system to allow the services to be provided during the work.

3.2 TRENCHING

- .1 Protect trench from contents of sewer pipes, conduits and connections.
- .2 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.
- .3 Dig trenches as stipulated in Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.3 INSTALLATION

- .1 Carry out MG20 aggregate bedding, coating and covering in accordance with BNQ Standard 1809-300.
- .2 Lay and join pipes in accordance with NQ 1809-300 Standard and with manufacturer's recommendations.
- .3 Lay pipes from the outlet point progressing upstream, and point female ends upslope.
- .4 Water flow through pipe during construction is forbidden.
- .5 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .6 Maintain pipe joints free from mud, silt, gravel and foreign material.
- .7 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
- .8 Make watertight connections to manholes.

3.4 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

- .3 Carry out backfilling in accordance with BNQ 1809-300 Standard.

3.5 SEWER CONNECTIONS

- .1 Install connection conduits in accordance with BNQ Standard 1809-300.
- .2 Connections must be joined to the main pipe with PVC tee-fittings with rubber gasket.
 - .1 Making connections by piercing the pipe wall and sealing the joint with mortar is prohibited.
- .3 Connection conduits must not extend into the main pipe.
- .4 For horizontal or vertical bends, use elbows of not more than 22.5°, separated by a section of pipe of a length at least four (4) times the diameter of the conduit.
 - .1 Use large-radius elbows.
- .5 Block off lateral connections using waterproof plugs (male or female) approved by the Departmental Representative.
- .6 Bring building connection conduit to 1 m from the outside wall of the building foundation, in line with the connection point to the main pipe.
 - .1 Install the connector sleeve required to connect to the building's water system.
 - .2 If the building's water system is already in place, make the connection, otherwise plug and seal the end of the waiting connecting pipe, then place a temporary marker. Make the connection once the building's water system is in place, after the system is compliance-tested.

3.6 FIELD TESTING

- .1 Proceed with cleaning of pipes and manholes. Cleaning must be undertaken by a specialist contractor.
- .2 Conduct watertightness tests (infiltration and exfiltration) on pipes and manholes and televisual inspections in accordance with BNQ Standard 1809-300.
- .3 Test sewer pipes one by one by checking every section between two (2) successive manholes, and every connection.
- .4 Allowable infiltration and exfiltration rates must not exceed the limits stipulated in BNQ 1809-300 Standard.
- .5 As needed, repair pipes and retest until the results fall within stated limits.
- .6 Repair any visible leak, regardless of the results obtained.
- .7 Supply 4 copies of televisual inspection reports, and test reports. Videos must be supplied on DVD.

3.7 SURFACE REPAIRING

- .1 Repair surfaces damaged by the works.

- .2 Provide the removal and reinstallation of the signalling panels, fences and other equipment in conflict with the proposed works

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 05 16 – Aggregate Materials.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 Bureau de normalisation du Québec (BNQ)
 - .1 BNQ 1809-300/2004 (R2007)-M2-2015 – “*Travaux de construction – Clauses techniques générales – Conduites d’eau potable et d’égout*” (construction work – general technical clauses – drinking water and sewer pipes).
 - .2 BNQ 2622-420/2009 – “*Regards d’égout, puisards, chambres de vanne et postes de pompage préfabriqués en béton armé*” (manholes, catch basins, valve chambers and precast reinforced concrete pumping stations).
 - .3 BNQ 1809-400/2013 – “*Travaux de réhabilitation dans tranchée- conduites d’eau potable et d’égout*” (Rehabilitation Work in trenches- drinking water and sewer pipes).

1.3 SCHEDULING

- .1 Schedule work such as to minimize interruptions to existing services and maintain existing flow during construction. Provide for required pumping. Service stoppages are not authorized.
- .2 Submit the schedule of expected interruptions for approval and adhere to the approved schedule.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the requested action/informational submittals in accordance with section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes, and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
- .4 Certification to be marked on pipe.
- .5 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.
- .6 Manufacturer's Instructions: submit to Departmental Representative 1 copy of manufacturer's installation instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 PLASTIC PIPE

- .1 Polyvinylchloride (PVC) pipes and raccords connexes compliant with NQ 1809-300 Standard, Class DR35 (maximum 375 mm) or DR28 (150 mm or less) with watertight seal.

2.2 REINFORCED CONCRETE PIPES

- .1 Reinforced concrete pipes (RCP) in accordance with BNQ 1809-300 Standard , diameter 450 mm or greater.

2.3 MANHOLES AND CATCH-BASIN MANHOLES

- .1 Precast concrete manholes in accordance with BNQ 2622-420 Standard. Manufacturer must hold a BNQ compliance certificate.
- .2 Storm manholes are fitted with a 300 mm diameter basin under the lowest connected pipe.
- .3 Steps must be of galvanized steel and comply with BNQ Standard 2622-420.
- .4 Manhole joints must be watertight.

2.4 CATCH BASINS

- .1 Circular reinforced-concrete catch basins of 610 mm internal diameter compliant with BNQ 1809-300 Standard with waterproof seal.
- .2 The outlet pipe is fitted with a cast-iron trap.
- .3 Catch basins have a reserve 300 mm below the level of the lowest connected pipe.
- .4 The catch basin connection is a 200-mm-diameter PVC pipe connected to the main pipe by means of a tee in the case of a PVC main pipe, or a connection saddle in the case of an RCP pipe in accordance with the BNQ 1809-300 Standard.
 - .1 Universal saddles are prohibited.

- .5 Catch basin frames are adjustable when in flexible pavement and fixed when in rigid pavement or off-roadway.
- .6 Grate is 750 mm in diameter, anti-bicycle type.
- .7 Catch basins are wrapped in an extruded PVC geomembrane on nonwoven polypropylene geotextile to depth of 1.8 m from the surface.

2.5 FRAMES, COVERS AND FRAME RISER

- .1 Parts for frames and covers must comply with BNQ Standard 1809-300.
- .2 All manholes must be fitted with a safety grate resting on the frame. The safety grate is of galvanized steel and 692 mm in diameter.
- .3 In rigid pavement or off-roadway, the contractor shall install a standard frame with a cover 775 mm in diameter.
- .4 In flexible pavement, the contractor shall supply and install a guide frame, a self-levelling frame and a cover 775 mm in diameter.
- .5 Covers must be marked "*Égout pluvial*" (Storm sewer).

2.6 CONNECTIONS

- .1 Pipes for connections are in polyvinylchloride (PVC) compliant with BNQ 1809-300 Standard, Class DR35 for diameters of 200 mm or more and DR28 for diameters of less than 200 mm.
- .2 Connections to the sewer are made with a PVC connection of the same class as the main sewer pipe or with a connection saddle for RCP pipes in accordance with BNQ 1809-300 Standard.
- .3 Universal saddles are prohibited.

2.7 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular material of type MG-20 in accordance with Section 31 05 16 - Aggregate Materials.

2.8 BACKFILL MATERIAL

- .1 Backfill materials: Class B or excavation material in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling

2.9 STRUCTURAL LINING

- .1 The sheath, shirt, resin and other components must meet the requirements of the BNQ 1809-400 Standard, part IV.

Part 3 Execution

3.1 PREPARATORY WORKS

- .1 Set up temporary means of erosion and sediments control in accordance with section 01 57 13 – Temporary Erosion and Sediments Control.
- .2 Set up the required temporary pumping system to allow the services to be provided during the work.

3.2 TRENCHING

- .1 Protect trench from contents of sewer pipes, conduits and connections.
- .2 Trench alignment and depth to approval of Departmental Representative prior to placing bedding material and pipe.
- .3 Dig trenches in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.3 INSTALLATION

- .1 Carry out MG20 aggregate bedding, coating and covering in accordance with BNQ 1809-300.
- .2 Lay and join pipes in accordance with NQ 1809-300 Standard and with manufacturer's recommendations.
- .3 Lay pipes from the outlet point progressing upstream, and point female ends upslope.
- .4 Water flow through pipes during construction is prohibited.
- .5 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .6 Maintain pipe joints free from mud, silt, gravel and other foreign material.
- .7 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.
- .8 Make watertight connections from pipes to manholes.

3.4 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.
- .3 Carry out backfilling in accordance with BNQ 1809-300 Standard.

3.5 SEWER CONNECTIONS

- .1 Install connection conduits in accordance with BNQ Standard 1809-300.
- .2 Connections must be connected to the main pipe with PVC tee-fittings with rubber gasket.
 - .1 Making connections by piercing the pipe wall and sealing the joint with mortar is prohibited.

- .3 Connection conduits must not extend into the main pipe.
- .4 For horizontal or vertical bends, use elbows of not more than 22.5°, separated by a section of pipe of a length at least four (4) times the diameter of the conduit.
 - .1 Use large-radius elbows.
- .5 Block off lateral connections using waterproof plugs (male or female) approved by the Departmental Representative.
- .6 Bring building connection conduit to 1 m from the outside wall of the building foundation, in line with the connection point to the main pipe.
 - .1 Install the connector sleeve required to connect to the building's water system.
 - .2 If the building's water system is already in place, make the connection, otherwise plug and seal the end of the waiting connecting pipe, then place a temporary marker. Make the connection once the building's water system is in place, after the system is compliance-tested.

3.6 STRUCTURAL LINING

- .1 Perform the work in accordance with the requirements of the BNQ 1809-400 Standard, part IV.
- .2 If manhole sections are removed and reinstalled, perform the work in accordance with BNQ 1809-300 Standard.
- .3 The sheath may be installed by drawing or inversion.
- .4 At the completion of work, carry out televisual inspections and supply a copy of the report to the Departmental Representative.

3.7 FIELD TESTS AND INSPECTIONS

- .1 Proceed with cleaning of pipes and manholes. Cleaning must be undertaken by a specialist contractor.
- .2 Conduct watertightness tests (infiltration and exfiltration) on pipes and manholes and televisual inspections in accordance with BNQ 1809-300 Standard.
- .3 Test sewer pipes one by one by checking every section between two (2) successive manholes, and every connection.
- .4 Allowable infiltration and exfiltration rates must not exceed the limits prescribed by BNQ 1809-300 Standard.
- .5 As needed, repair pipes and retest until the results fall within stated limits.
- .6 Repair any visible leak, regardless of the results obtained.
- .7 Supply 4 copies of televisual inspection reports, and test reports. Videos must be supplied on DVD.
- .8 Carry out televisual inspections, produce the report of contractor and perform tests in accordance with BNQ 1809-400, part IV Standard.

3.8 SURFACE REPAIRING

- .1 Repair surfaces damaged by the works.
- .2 Provide the removal and reinstallation of the signalling panels, fences and other equipment in conflict with the proposed works

3.9 CLEANING

- .1 Progress Cleaning: Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION