

BUILDING CONNECTIONS

PART 1 GENERAL

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| 1.01 OTHER CONTRACT DOCUMENTS | The General Conditions of the Contract, General Requirements, and Supplemental Conditions attached hereto shall apply to and be part of this Section. |
| 1.02 DESCRIPTION OF WORK | <p>The Work described herein is for the supply and installation of Water Connections having a nominal pipe diameter of 50 millimetres or less, and Sewer Connections having a nominal pipe diameter of 150 millimetres or less.</p> <p>Water Connections having a nominal pipe diameter of 150 millimetres and greater shall be constructed as described in Section 02660, Watermains, of the Standard Construction Specifications, and Sewer Connections having a nominal pipe diameter of 200 millimetres and greater shall be constructed as described in Section 02700, Sewers, of the Standard Construction Specifications.</p> |
| 1.03 RELATED WORK | <p>Section 02210 Excavation Bedding & Backfill</p> <p>Section 02660 Watermains</p> <p>Section 02700 Sewers</p> |
| 1.04 CLASSIFICATION OF THE WORK | Building Connections shall be classified as either a Water Connection or a Sewer Connection with each type described on the basis of the conduit size expressed as the nominal inside diameter of the connection pipe, valve, fitting or method of connection to the watermain, sewer main or existing building connection. |
| 1.05 MINIMUM SIZE OF CONNECTION | <p>Each Water Connection shall be sized to carry the anticipated water requirements of the building, however no Water Connection shall be less than 19 millimetres inside nominal diameter.</p> <p>Each Sewer Connection shall be sized to carry the anticipated waste water flow from the building, however no Sewer Connection shall be less than 100 millimetres inside nominal diameter.</p> |

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PART 2 PRODUCTS

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| 2.01 WATER
CONNECTION PIPE | Unless otherwise specified in Section 01001 Supplemental Conditions or shown on the Drawings, Water Connection pipe shall be Type K annealed (soft) seamless copper tubing conforming to the current AWWA Standard C800 'Appendix of Collected Standards for Service Line Materials.' |
| 2.02 WATER
CONNECTION MAIN
STOP VALVE | <p>Corporation main stop valve shall be all brass or bronze manufacture conforming to the current AWWA Standard C800 'Appendix of Collected Standards for Service Line Materials,' complete with AWWA tapered thread on the inlet end and a conductive rubber and steel seated compression fitting complete with electrical thaw wire connector on the outlet end.</p> <p>Main stop shall be Mueller H-12924 (19mm/25mm) and Mueller H-15013 (38mm/50mm) or approved equal.</p> <p>Ground clamps for 38 and 50 millimetre valves shall be all brass Burndy number GAR-174C or 184C or approved equal.</p> |
| 2.03 WATER
CONNECTION
SADDLE | The saddle body shall be all brass or bronze manufacture, complete with conductive rubber compression ring gasket and AWWA tapered outlet thread. Inlet shall be 50 millimetre with all brass or bronze reducer bushing supplied to suit dimension for the type and size of main stop valve specified. |
| 2.04 PVC TAPPED
WATER
CONNECTION
COUPLER | Saddle shall be Ford S90, Mueller 1344x or approved equal. PVC tapped water connection coupler shall be Polyvinyl Chloride (PVC) having a cell classification of 12454B and shall be manufactured in accordance with AWWA Standard C907 'PVC Watermain Fittings 4 inch through 8 inch' and CAN/CSA-B137.2 'PVC Injection-Moulded Gasketed Fittings for Pressure Applications.' The injection moulded PVC fitting shall be minimum DR 18 (Class 150), complete with an AWWA tapered outlet thread to suit the dimension for the type and size of main stop valve specified. |

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2.05 WATER
CONNECTION
COUPLER

Couplers used to join similar sections of water connection pipe shall be all brass or bronze manufacture conforming to the current AWWA Standard C800 'Appendix of Collected Standards for Service Line Materials, complete with conductive rubber and steel seated compression fitting on each inlet end.

Couplers shall be Mueller H-15403 or approved equal.

2.06 WATER
CONNECTION
CURB STOP VALVE

Curb stop valve shall be all brass or bronze manufacture conforming to the current AWWA Standard C800 'Appendix of Collected Standards for Service Line Materials,' and shall be either a press fitted plug or ball valve with straight through unobstructed flow when full open. The curb stop valve shall be complete with a conductive rubber and steel seated compression fitting on each inlet end and be electrically continuous between the operating head and the inlet connections. The curb stop shall open and close over 90 degrees of turn only. A positive drain hole shall be provided on the outlet side of the curb stop and shall be closed when the stop is open and open when the stop is closed. The starting or operating torque of the stop shall not exceed 7 Newton metres. Curb stop shall be Mueller H-15219 or approved equal.

2.07 WATER
CONNECTION
CURB STOP BOX

The curb stop box shall be a top adjusting type suitable for 2 to 4 metre bury and shall be supplied complete with a 16 millimetre diameter solid stainless steel spindle of sufficient length for the required depth of bury with the upper end forged to fit a service box operating key, shaped to center the rod within the box stem and also shaped parallel to the bottom yoke to provide a positive indication of the position of the curb stop valve (open or closed). The spindle bottom yoke shall be sized to fit all makes of curb stop valve keys between 19 and 50 millimetres nominal size and drilled to accept a 5 millimetre diameter brass or stainless steel cotter pin, located centrally on the yoke no more than 10 millimetres from the centre line of the hole to the extremity of the yoke.

Curb stop box shall be W. D. Valve Box VB34 (19mm/25mm) and VB35 (38mm/50mm) or approved equal.

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- 2.08 WATER
CONNECTION
ADAPTOR
- Adaptors for connecting water connection pipe to existing building service pipe shall be all brass or bronze manufacture conforming to the current AWWA Standard C800 'Appendix of Collected Standards for Service Line Materials,' complete with conductive rubber and steel seated compression fitting on the inlet end and an approved compression or flared fitting on the outlet end of a type and size required to connect to the existing building service pipe material.
- 2.09 THAW WIRE
- Thaw wire shall be #0 insulated stranded copper wire.
- 2.10 SEWER
CONNECTION PIPE
AND FITTINGS
- Unless otherwise specified in Section 01001 Supplemental Conditions or shown on the Drawings, Sewer Connection pipe and fittings shall be Polyvinyl Chloride (PVC) DR 35, having a cell classification of 12454B and a minimum pipe stiffness of 320 kPa. All pipe and fittings shall be manufactured in accordance with the current ASTM Standard D3034 "Type PSM Poly (Vinyl Chloride)(PVC) Sewer Pipe and Fittings" and CAN/CSA B182.2 "PVC Sewer Pipe and Fittings."
- Each length of Sewer Connection pipe shall have a bell end complete with a factory installed elastomeric gasket. Pipe shall be coloured green and supplied in lengths not in excess of 4.0 metres.
- Sewer Connection fittings, (tees, bends, plugs, and reducers) shall be injection moulded PVC manufactured from the same material, class and type as the sewer connection pipe to which it will be connected to. Fittings shall be coloured white or green. Pipe and/or fittings which have been manufactured in excess of thirty months prior to installation will not be accepted for incorporation into the Work.
- 2.11 SEWER
CONNECTION
SADDLE
- Sewer Connection Saddle shall be a PVC plastic strap on saddle complete with rubber gasket and two all stainless steel worm drive clamps or straps. The Sewer Connection Saddle shall be of a type and size to suit both the Sewer Connection pipe and the Sewer main pipe material and diameter to which it is being installed.

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- 2.12 SEWER CONNECTION COUPLER Sewer Connection Coupler used to connect two pipes of similar or dissimilar material shall have rubber gasket joints. The manufacturer of the coupler must specifically state the coupler will provide a sound and watertight connection between the two pipes being connected. A rubber gasket slip-on coupler shall be used for a PVC to PVC or PVC to ABS connection only, all other types of connections shall require a flexible rubber coupling; 'Fernco' or approved equal. A coupler requiring a solvent sealed joint will not be permitted.
- 2.13 CEMENT MORTAR Cement mortar shall consist of equal parts of Type 50 sulphate resistant Portland cement as described in Section 02512, Ready Mixed Concrete, and clean sharp mortar sand mixed dry with only enough water added to make the mixture workable. Mortar which has begun to set shall not be used.

PART 3 EXECUTION

- 3.01 GRADE & ALIGNMENT Each Building Connection shall be installed to the line and grade shown on the Drawings and as set out at the Site by the Engineer. Vertical variance from grade shall not exceed 25 millimetres and horizontal variance from line shall not exceed 100 millimetres. The minimum grade for Sewer Connection pipe shall be 20 millimetres per metre (2%) and the maximum grade for Sewer Connection pipe shall be 60 millimetres per metre (6%). Building Connections shall be installed as shown the Standard Drawing STD 1111K attached to this Section, as shown on the Drawings, or as directed by the Engineer. Sharp bends in the pipe will not be permitted even though the pipe remains within tolerances. Bends on the sewer connection pipe shall not exceed the manufactures recommended tolerances.
- Each Sewer Connection shall be installed to the **east** or **south** of the Water Connection.
- 3.02 EXCAVATION Excavation shall be in accordance with Section 02210, Excavation Bedding & Backfill.
The interior of all pipes shall be kept free of dirt, concrete or superfluous materials of every description as the Work proceeds.

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3.03 DEPTH OF COVER Building Connections shall be placed a minimum of 3.0 metres below the proposed finished ground elevation unless directed otherwise by the Engineer or stated on the City of Brandon Sewer and Water Permit. Building Connections placed with less than 3.0 metres of cover shall be insulated as stated in Part 3.99 of Section 02210, Excavation Bedding & Backfill.

The water connection pipe shall be installed above the sewer connection pipe.

If the sewer main depth exceeds 4.25 metres, and the grade to the sewer is excessive the Engineer may instruct the Contractor to install a riser on the Sewer Connection as described in Part 3.10 of this Section.

3.04 CONNECTION TO WATERMAIN 19 and 25 millimetre water connection main stop valves shall be installed in the top quadrant of the watermain pipe at an angle of between 0 degrees and 30 degrees above horizontal, and 38 and 50 millimetre water connection main valves shall be installed horizontally into the watermain pipe.

Each Water Connection to a new 150 or 200 millimetre watermain shall be made with a PVC tapped water connection coupler installed during the installation of the watermain as described in Section 02670 Watermains. Each Water Connection to new 250 millimetre and larger watermain and all existing watermains shall be by direct tap or with the use of an approved water connection saddle.

Direct tapping of watermains shall be as follows:
150mm - 300mm watermain direct tap 19mm or 25mm only.

Other sizes and classes of watermain may be direct tapped if recommended by the pipe manufacturer and approved by the Engineer. If direct tapping is not recommended or approved, a water connection saddle shall be installed on the watermain in accordance with the manufacture's written instructions.

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A watermain pipe shall be direct tapped in strict accordance with the pipe manufacture's written instructions and with the use of an approved tapping machine. No tap shall be within 600 millimetres of the end of the watermain pipe and multiple taps shall be staggered a minimum of 450 millimetres on centre. The water connection main valve shall be threaded into the watermain pipe with the use of the tapping machine. The tapping tool shall be removed, the main stop closed.

Water connection main valves shall be tightened into asbestos-cement and ductile iron pipe with 70-80 Newton metres of torque with 1 to 3 threads showing and into PVC watermain with 35-40 Newton metres of torque with 1 to 2 threads showing. The thread of the corporation stops used on PVC and ductile iron pipe shall be wrapped with three to four wrappings of Teflon pipe thread tape (leave 1st two threads unwrapped) prior to installation.

A watermain pipe requiring a saddle shall have the maximum recommended size of hole, for the saddle being installed, drilled in the watermain pipe. The saddle and clamp shall be placed on the main and the saddle screws alternately tightened to maintain equal gaps between saddle sections to ensure a secure and watertight fit around the watermain, but not so tight to cause any deformation of the watermain pipe.

**3.05 INSTALLATION
OF WATER
CONNECTION PIPE**

The water connection pipe shall be connected to the main stop. Each section of pipe shall be accurately placed on a dry, firm foundation of bedding material to the line and grade stated in Parts 3.01 and 3.02 of this Section and backfilled as described in Section 02210 Excavation Bedding & Backfill. The water connection pipe shall be laid with a combination horizontal and vertical gooseneck, free of any kinks, as shown on the Standard Drawing STD 1111K attached to this Section. The loop of the gooseneck shall be set off-centre in the direction which shall tighten the main stop if settlement of the backfill occurs.

Couplers will NOT be permitted on new 19, 25, or 38 millimetre water connections. Each connection from the watermain to the curb stop valve shall be made with one continuous length of water connection pipe. Each 50

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millimetre water connection pipe shall be installed from the watermain to the curb stop valve with the minimum number of water connection pipe couplers.

**3.06 CURB STOPS AND
SERVICE BOXES**

Curb stops shall be located at the limit of the right of way and installed as shown on the Standard Drawing STD 1111K attached to this Section, shown on the Drawings, or directed by the Engineer. The curb stop valve shall be set on a solid unyielding base and correctly positioned to drain water from the building service when in the shut-off position. If directed by the Engineer a 0.33 cubic metre gravel drainage sump shall be placed below and around the curb stop valve.

The curb stop box shall be placed plumb over the curb stop valve and shall be supported solely by the base. The lower section of the service box and the extension spindle shall be a minimum of 300 millimetres below the finished grade to prevent heavy loads from being transmitted to the curb stop valve. Following the installation of the thaw wire the curb stop box height shall be adjusted to correspond with the depth of cover as stated in Part 3.03 of this Section.

The curb stop valve shall be left in the closed position and a 50 by 100 millimetre wood marker, with the upper 600 mm painted blaze orange or red, driven into the ground beside the curb stop box.

3.07 THAW WIRES

Each water connection shall have a thaw wire installed as shown on the Standard Drawing STD 1111K attached to this Section and as directed by the Engineer. A thaw wire shall be installed in the drilled connector or ground clamp of all corporation main valves and looped continuously between any two services in such a manner that all the water connections are connected in pairs. The thaw wire shall be separated from the water main by a minimum of 0.5 metres.

For a single water connection where it is impracticable to loop the thaw wire to another corporation main valve, the thaw wire shall be placed beside the water connection pipe in the open trench then wrapped around the curb box shaft and extension and secured in place with duct tape. The curb box shall be

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installed fully extended to allow for the maximum amount of thaw wire to be installed. The thaw wire shall be cut flush beneath the curb valve box top, fastened to the service box stem with duct tape and the extension driven down to finished grade. The thaw wire and service shall have an electrical resistance of no more than 0.005 Ohms when measured between the top of the curb valve extension spindles of two joined curb valves. An open circuit will not be accepted.

**3.08 CONNECTION TO
NEW SEWER MAIN**

Each Sewer Connection to a new sewer main pipe shall be at the location shown on the Drawings or as directed by the Engineer. The Sewer Connection shall be made with a new moulded or factory fabricated tee fitting joined to the main sewer pipe by the same means and methods used to join the sewer main pipe as described in Section 02700, Sewers, of the Specifications and as shown on STD 1111G attached to this Section. A tee fabricated on Site will not be permitted. The outlet bell of the tee shall be positioned at an angle equal to that of the connection pipe, but under no circumstances shall the angle be greater than 35 degrees or less than 1 degree up from the spring line of the pipe.

**3.09 CONNECTION TO
EXISTING SEWER
MAIN**

Each Sewer Connection to a precast wye or tee on an existing vitrified clay, asbestos cement, or concrete sewer main pipe or a repair to an existing sewer connection pipe shall be made with an approved sewer connection coupler installed as directed by the Engineer. All exposed pipes shall be clean and sound with the coupler installed in a watertight and structurally sound manner.

Each Sewer Connection to an existing vitrified clay, asbestos cement, concrete, or PVC sewer main pipe where a precast wye or tee does not exist shall be made with an approved sewer connection saddle. The sewer connection saddle shall be installed on the sewer main in accordance with the saddle manufacturer's instructions and as shown on STD 1111G attached to this Section. A neat circular hole of sufficient size to accept the saddle shall be cut in the upper half of the sewer main pipe using a hole saw designed for that purpose. The outlet spigot of the saddle shall be positioned at an angle equal to that of the connection pipe, but under no circumstances

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shall the angle be greater than 35 degrees or less than 1 degree up from the spring line of the pipe. Care shall be taken to avoid damaging, cracking or allowing dirt, cuttings, the pipe coupon, mortar or other superfluous materials from entering the sewer main pipe.

The sewer connection saddle shall not protrude beyond the inside wall of the sewer main pipe and shall be attached to the sewer main pipe in a watertight and structurally sound manner. The joint between the saddle and the sewer main pipe shall have an application of non shrink grout or cement powder applied to both surfaces as directed by the Engineer. Other methods of connection which provide a watertight and structurally sound connection of the sewer connection pipe to the sewer main are subject to review and approval by the Engineer.

**3.10 INSTALLATION OF
SEWER
CONNECTION PIPE**

The sewer connection pipe shall be installed as shown on STD 1111K attached to this Section and the Drawings. The entire length of pipe and fittings shall be fully supported by a 100 millimetre thick layer of compacted bedding sand placed uniformly along the bottom of the trench. Installation of the sewer connection pipe shall commence at the lowest point of the length being laid with the spigots pointing in the direction of the flow. Pipe and fittings shall be installed in accordance with the manufacturer's recommendations and fitted together so when complete, the Sewer Connection will have a smooth and uniform invert. Bends shall be used to adjust the vertical alignment of the pipe, but shall not be used to adjust the horizontal alignment of the pipe. Compacted sand backfill shall extend to a depth of 200 millimetres above the top of the pipe and fittings for the full width of the trench.

If the depth of bury to the sewer main is in excess of 4.25 metres, a riser shall be installed, as shown in STD 1111G attached to this Section or as directed by the Engineer, to raise the invert of the sewer connection pipe to a minimum depth of 3.35 metres below the existing or proposed finished grade, whichever is the greater. Care shall be taken to provide proper compaction of the backfill material about the sewer main connection and the riser section to prevent settlement.

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If the Sewer Connection is installed across a recently excavated trench, care shall be taken to compact the backfill under the sewer connection pipe continuously from the lower existing pipe to the spring line of the sewer connection pipe and extending 1.0 metre on either side of the sewer connection pipe.

The Sewer Connection shall terminate at the property limit or limit of the four party utility easement, with a bell end complete with an approved plug. A wooden marker shall be installed at the termination point of the service connection. The marker shall be of sufficient length to extend from the invert of the sewer plug to distance of one metre above the existing ground elevation.

A cleanout shall be installed where shown on the Drawings or as directed by the Engineer.

A connection to an existing Sewer Connection shall be made with an approved coupler.

3.11 ABANDONED SEWERS

An abandoned sewer connection shall be sealed at the right of way limit by placing a minimum thickness of 500 millimetres of 10.5 MPa concrete into the open end of the sewer connection pipe (not the building service pipe) to form a complete and watertight plug.

3.12 TESTING

Hydrostatic testing and disinfection of a new Water Connection attached to a new watermain shall be in accordance Part 3.12 of Section 02660 Watermains.

The hydrostatic testing and disinfection of a new Water Connection and/or Building Water Connection connected to an existing watermain shall be done by first filling the new service line with water, closing off all valving to the building and examining the Work for any visible signs of leakage. If there are no leaks, the Contractor shall then close the corporation valve to isolate the line for a period of no less than one (1) hour to allow for sufficient chlorine contact in the service line, the line shall then be flushed for a minimum of five (5) minutes to clear the service line.

The rate of infiltration of a Building Sewer Connection shall be in accordance Part 3.16 of Section 02700 Sewers.

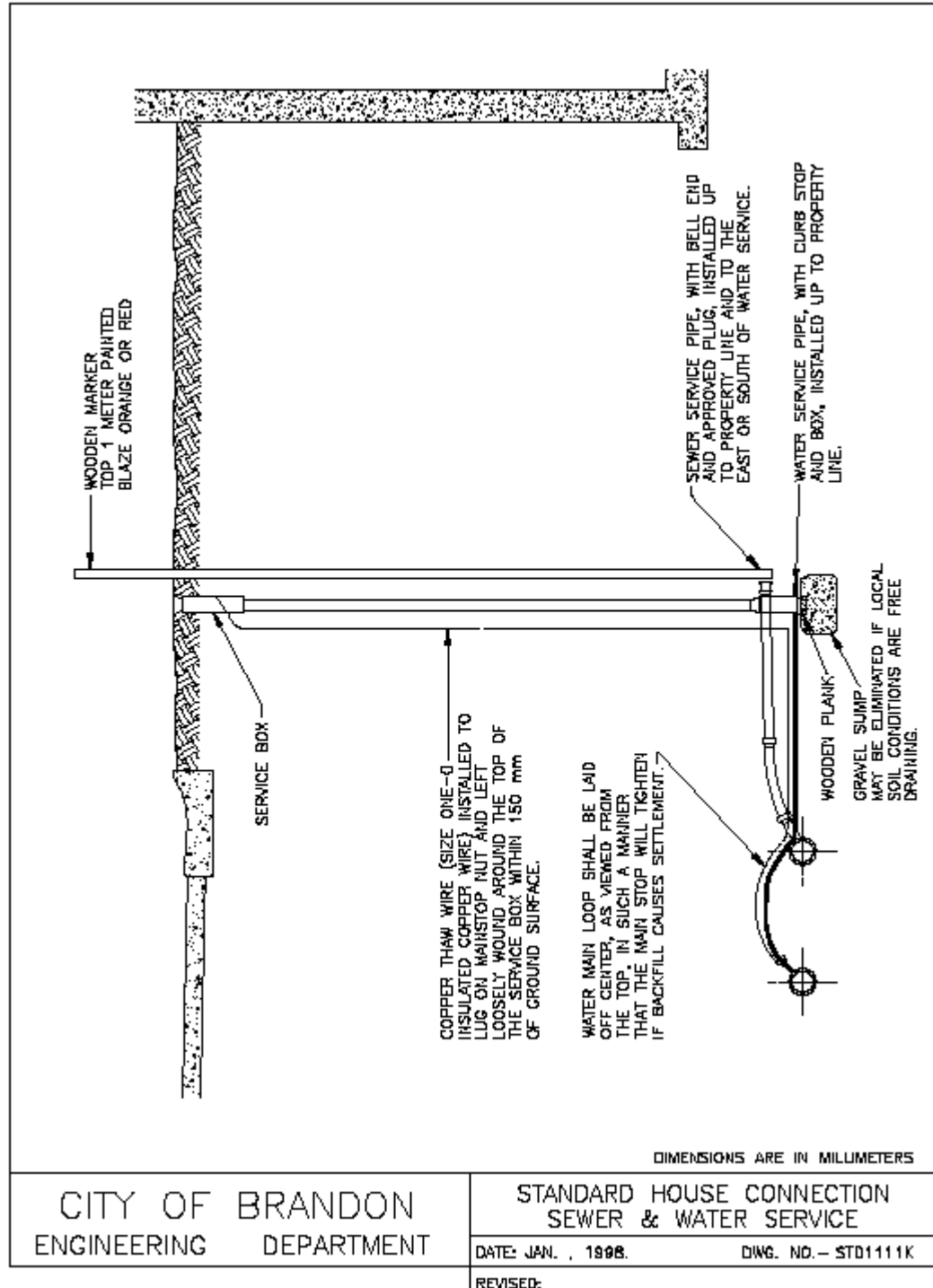
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3.13 BUILDING SERVICE CONNECTION Before connecting a building water service to an existing curb stop valve the Contractor shall operate the curb stop valve to insure that adequate water is available. If there is no water, the flow is poor, or the curb stop malfunctions, the Contractor shall immediately stop the Work and request direction from the Engineer. Once the connection is complete, the Contractor shall operate the curb stop valve in the presence of the Engineer.

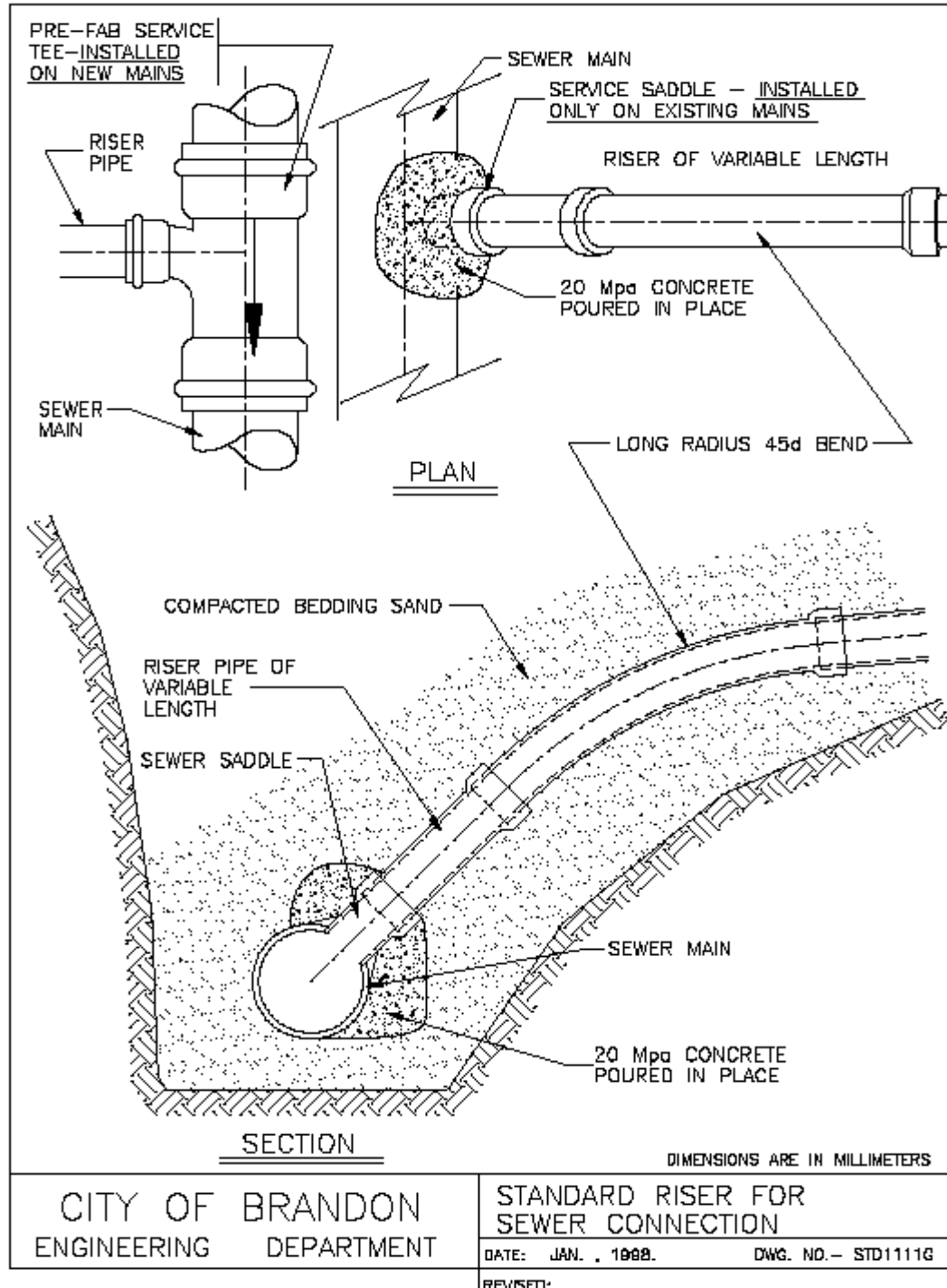
A connection to an existing building sewer service shall be made by removing the existing plug and installing the building service pipe into the exposed bell or if a new bell does not exist, the contractor shall make the connection using a coupling as manufactured by Fernco Inc. or an approved equal to ensure a watertight connection.

A building service connection backfilled without the Engineer's prior approval will be uncovered and inspected by the Engineer at the sole cost of the contractor.

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END OF SECTION